UNDERGRADUATE ANNOUNCEMENTS

2001-2002

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CLEMSON UNIVERSITY

UNDERGRADUATE ANNOUNCEMENTS

2001-2002

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PURPOSE OF CATALOG

The purpose of this catalog is to give a general description of Clemson University and to provide prospective students with detailed information regarding the various colleges and departments within the University and curricula offered by the University. Inasmuch as the educational process necessitates change, the information and educational requirements in this catalog represent a flexible program which may be altered where such alterations are thought to be in the mutual interest of the University and its students.

The provisions of this catalog do not constitute a contract which may be accepted by students through registration and enrollment in the University. The University reserves the right to change without notice any fee, provision, offering or requirement in this catalog and to determine whether a student has satisfactorily met its requirements for admission or graduation. The University further reserves the right to require a student to withdraw from the University for cause at any time.

Each curriculum shall be governed by the requirements in effect on the date of enrollment. If a student withdraws from the University and subsequently returns or does not remain continuously enrolled (summers excluded), the requirements in effect at the time of return will normally prevail.

STUDENT RESPONSIBILITY

All colleges and departments establish certain academic requirements that must be met before a degree is granted. Advisors, department chairs, and deans are available to help the student understand and meet these requirements; but the student is responsible for fulfilling them. If, at the end of a student's course of study, the requirements for graduation have not been satisfied, the degree will not be granted. For this reason, it is important for students to acquaint themselves with all academic requirements throughout their college careers and to be responsible for completing all requirements within prescribed deadlines and time limits.

FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT

The Family Educational Rights and Privacy Act of 1974 (FERPA) affords eligible students certain rights with respect to their education records. They are as follows:

1. The right to inspect and review the student's education records (provided the student has not waived this right) within 45 days of the day the University receives a request for access.

Students should submit to the registrar, dean, head of the academic department, or other appropriate official, a written request identifying the record(s) they wish to inspect. The University official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the University official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

2. The right to request the amendment of the student's education records that the student believes are inaccurate or misleading.

Students may ask the University to amend a record that they believe is inaccurate or misleading. To challenge the accuracy of an education record, the student should write to the registrar or other University official responsible for the record and clearly identify the part of the record he/she wants changed and specify why it is inaccurate or misleading. If the University official decides not to amend the record as requested by the student, the University official will notify his/her vice president. The vice president will then notify the student of his/her right to a hearing regarding the request for an amendment. Additional information regarding the hearing procedures will be provided to the student when notified of his/her right to a hearing.

Note: The challenge of a student under this paragraph is limited to information which relates directly to the student and which the student asserts is inaccurate or misleading. With regard to a student's grade, this right does not permit the student to contest a grade on the grounds that a higher grade is deserved, but only to show that the grade has been inaccurately recorded.

3. The right to consent to the disclosure of personally-identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.

One exception which permits disclosure without consent is disclosure to school officials with legitimate educational interest. A school official is a person employed by the University; a person or company with whom the University has contracted (such as an attorney, auditor, or collection agent); a person serving on the board of trustees; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another University official in performing his or her tasks. A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his/her professional responsibilities.

Upon request, the University discloses education records without consent to officials of another school in which a student seeks or intends to enroll.

4. The right to refuse to permit the designation of any or all of the following categories of personally identifiable information as directory information, which is not subject to the above restrictions on disclosure: student's full name, home address and telephone number, campus address and telephone number, campus e-mail address, state of residence, date and place of birth, marital status, academic class, class schedule and class roster, name of advisor, major field of study, including the college, division, department or program in which the student is enrolled, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance and graduation, degrees and honors and awards received including selection to a dean's list or honorary organization and the grade point average of students selected, and the most previous educational institution attended. Photographic, video, or electronic images of students taken and maintained by the University are also considered directory information.

Directory information may be disclosed by the University for any purpose, at its discretion. Any student wishing to exercise his/her right to refuse to permit the designation of any or all of the above categories as directory information must give written notification to the Registration Services Office (E-206 Martin Hall) by the last day to register for the enrollment period concerned as published in the Clemson University calendar.

5. The right to file a complaint with the U. S. Department of Education concerning alleged failures by Clemson University to comply with the requirements of FERPA. The name and address of the office that administers FERPA is Family Policy Compliance Office, U. S. Department of Education, 600 Independence Avenue SW, Washington, DC 20202-4605.

ENGLISH FLUENCY

Clemson University has established a policy to assure that all instructional activities are conducted by individuals possessing appropriate proficiency in written and oral use of the English language. Instructional activities include lectures, recitation or discussion sessions, and laboratories. The individuals to be certified include full-time and part-time faculty, graduate teachers of record, graduate teaching assistants and graduate laboratory assistants for whom English is not the first language.

A student who experiences difficulty with an instructor's written or oral English and who wishes to seek relief must do so prior to the seventh meeting of a 50-minute class and prior to the fifth meeting of a 90-minute class in regular semesters. In the five-week summer sessions, relief must be sought prior to the third class meeting.

The procedure is summarized as follows:

a. The student must quickly bring the problem to the attention of the instructor's department chair either directly or through a faculty member such as the student's advisor. That department chair will assess the complaint and, if deemed valid, offer an appropriate remedy within two days.

b. A student who is not satisfied with the department chair's decision or the relief suggested, may appeal within two days to a five-member hearing panel comprised of three faculty members and two students appointed by the Senior Vice Provost and Dean of Undergraduate Studies.

Students with questions should contact the Associate Dean of Undergraduate Academic Services, 101 Sikes Hall.

PATENTS AND COPYRIGHTS

All students enrolling in Clemson University do so with full understanding that

1. The University has full ownership rights in any inventions, discoveries, developments and/or improvements, whether or not patentable (inventions), which are conceived, developed, or reduced to practice or caused to be conceived, developed, or reduced to practice by undergraduate students during the course of their academic activities conducted as part of any undergraduate curriculum. Any such invention will be handled by the University in the same manner as set forth in the *Faculty Manual of Clemson University*, the pertinent provision for which appears as Part VI E entitled "Patent Policy."

2. Copyright ownership of any research work will be determined by University policy and by policies of organizations responsible for publishing or distributing copyrighted material.

Copies of the policies on patents and copyrights are available in the individual departments and colleges and in the Special Projects Office.

EQUAL OPPORTUNITY AFFIRMATIVE ACTION

Clemson University, in compliance with Titles VI and VII of the Civil Rights Act of 1964, as amended, Title IX of the Education Amendments of 1972, and Sections 503 and 504 of the Rehabilitation Act of 1973, does not discriminate on the basis of race, color, national origin, religion, sex, or disability in any of its policies, procedures, or practices; nor does the University, in compliance with the Age Discrimination in Employment Act of 1967, as amended, and Section 402 of the Vietnam Era Veterans Readjustment Act of 1974, discriminate against any employees or applicants for employment on the basis of their age or because they are disabled veterans or veterans of the Vietnam era. Clemson University conducts its programs and activities involving admission, access, treatment, employment, teaching, research, and public service in a nondiscriminatory manner as prescribed by Federal laws and regulations.

In conformance with University policy and pursuant to Executive Order 11246, as amended, Section 503 of the Rehabilitation Act of 1973, and Section 402 of the Vietnam Era Veterans Readjustment Act of 1974, Clemson University is an Affirmative Action/Equal Opportunity Employer.

Inquiries concerning the above may be addressed to the following: Executive Secretary, Clemson University Board of Trustees, 201 Sikes Hall, Clemson University, Clemson, SC 29634; Director, Office for Access and Equity, E-103 Martin Hall, Clemson University, Clemson, SC 29634; Director, Office for Civil Rights, Department of Education, Washington, DC 20201.

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ACADEMIC CALENDAR

Maymester 2001

May 14, M	Late registration and first day of class
May 15, Tu	Last day to register; late enrollment fee applies
May 16, W	Last day to drop a class or withdraw from the University without a W grade
May 19, Sa	Classes meet
May 22, Tu	Last day to drop a class or withdraw from the University without final grades
May 26, Sa	Classes meet
May 29, Tu	Examinations

First Summer Session 2001

May 21, M	Late registration
May 22, Tu	Classes begin; late enrollment fee applies
May 23, W	Last day to register or add a class
May 25, F	Last day to drop a class or withdraw from the University without a W grade
June 7, Th	Last day to drop a class or withdraw from the University without final grades
June 11, M	Last day to order diploma for August graduation
June 26, Tu	Examinations

Second Summer Session 2001

July 2, M	Orientation
July 3, Tu	Late registration
July 4, W	Holiday
July 5, Th	Classes begin; late enrollment fee applies
July 6, F	Last day to register or add a class
July 7, Sa	Classes meet
July 9, M	Last day to drop a class or withdraw from the University without a W grade
July 20, F	Last day to drop a class or withdraw from the University without final grades
August 8, W	Examinations
August 10, F	Candidates may access grades via TigerLine or TigerWeb
August 11, Sa	Graduation

Fall Semester 2001

August 19–20, Su–M	Orientation
August 20–21, M–Tu	Late registration
August 21, Tu	Convocation
August 22, W	Classes begin; late enrollment fee applies
August 28, Tu	Last day to register or add a class
September 4, Tu	Last day to drop a class or withdraw from the University without a W grade
September 11, Tu	Last day to order diploma for December graduation
October 12, F	Last day to drop a class or withdraw from the University without final grades
October 15–16, M–Tu	Fall break
November 5, M	Registration for spring, Maymester, and summer terms begins
November 21–23, W–F	Thanksgiving holidays
December 6–7, Th–F	Classes meet; exams permitted in labs only
December 8–15, Sa–Sa	Examinations
December 19, W	Candidates may access grades via TigerLine or TigerWeb
December 20, Th	Graduation

Spring Semester 2002

January 6–7, Su–M	Orientation
January 7–8, M–Tu	Late registration
January 9, W	Classes begin; late enrollment fee applies
January 14, M	Martin Luther King, Jr. holiday
January 16, W	Last day to register or add a class
January 23, W	Last day to drop a class or withdraw from the University without a W grade
January 30, W	Last day to order diploma for May commencement
March 1, F	Last day to drop a class or withdraw from the University without final grades
March 18–22, M–F	Spring break
April 1, M	Registration for fall semester begins
April 6–13, Sa–Sa	Honors and Awards Week
April 25–26, Th–F	Classes meet; exams permitted in labs only
April 27–May 4, Sa–Sa	Examinations
May 9, Th	Candidates may access grades via TigerLine or TigerWeb
May 10, F	Commencement (time of ceremony under review)

Maymester 2002

May 13, M	Late registration and first day of class
May 14, Tu	Last day to register; late enrollment fee applies
May 15, W	Last day to drop a class or withdraw from the University without a W grade
May 18, Sa	Classes meet
May 21, Tu	Last day to drop a class or withdraw from the University without final grades
May 25, Sa	Classes meet
May 28, Tu	Examinations

First Summer Session 2002

May 20, M	Late registration
May 21, Tu	Classes begin; late enrollment fee applies
May 22, W	Last day to register or add a class
May 24, F	Last day to drop a class or withdraw from the University without a W grade
June 6, Th	Last day to drop a class or withdraw from the University without final grades
June 10, M	Last day to order diploma for August graduation
June 25, Tu	Examinations

Second Summer Session 2002

July 1, M	Orientation
July 2, Tu	Late registration
July 3, W	Classes begin; late enrollment fee applies
July 4, Th	Holiday
July 5, F	Last day to register or add a class
July 6, Sa	Classes meet
July 8, M	Last day to drop a class or withdraw from the University without a W grade
July 19, F	Last day to drop a class or withdraw from the University without final grades
August 7, W	Examinations
August 9, F	Candidates may access grades via TigerLine or TigerWeb
August 10, Sa	Graduation

Fall Semester 2002

August 18–19, Su–M	Orientation
August 19–20, M–Tu	Late registration
August 20, Tu	Convocation
August 21, W	Classes begin; late enrollment fee applies
August 27, Tu	Last day to register or add a class
September 3, Tu	Last day to drop a class or withdraw from the University without a W grade
September 10, Tu	Last day to order diploma for December graduation
October 11, F	Last day to drop a class or withdraw from the University without final grades
November 4–5, M–Tu	Fall break
November 6, W	Registration for spring, Maymester, and summer terms begins
November 27–29, W–F	Thanksgiving holidays
December 5–6, Th–F	Classes meet; exams permitted in labs only
December 7–14, Sa–Sa	Examinations
December 18, W	Candidates may access grades via TigerLine or TigerWeb
December 19, Th	Graduation

Spring Semester 2003

January 5–6, Su–M	Orientation
January 6–7, M–Tu	Late registration
January 8, W	Classes begin; late enrollment fee applies
January 13, M	Martin Luther King, Jr. holiday
January 15, W	Last day to register or add a class
January 22, W	Last day to drop a class or withdraw from the University without a W grade
January 29, W	Last day to order diploma for May commencement
February 28, F	Last day to drop a class or withdraw from the University without final grades
March 17–21, M–F	Spring break
March 31, M	Registration for fall semester begins
April 5–12, Sa–Sa	Honors and Awards Week
April 24–25, Th–F	Classes meet; exams permitted in labs only
April 26–May 3, Sa–Sa	Examinations
May 8, Th	Candidates may access grades via TigerLine or TigerWeb
May 9, F	Commencement 9:30 A.M. (Colleges AF&LS, AA&H, and E&S) 2:30 P.M. (Colleges B&BS and HE&HD)

Note: Dates on this calendar were accurate at the time of printing. Dates, however, may change as conditions warrant. Current information is available at our Web site at www.registrar.clemson.edu/publicat/catalog/calendar.htm.

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GENERAL INFORMATION

HISTORY

When one man of wisdom and foresight can look among the despair of troubled times and imagine what could be, great things can happen. That is what the University's founder, Thomas Green Clemson, was able to do in the post-Civil War days. He looked upon a South that lay in economic ruin, once remarking that "conditions are wretched in the extreme" and that "people are quitting the land." Still, among the ashes he saw hope. Mr. Clemson envisioned what could be possible if the South's youth were given an opportunity to receive instruction in scientific agriculture and the mechanical arts. He once wrote, "The only hope we have for the advancement of agriculture (in the U.S.) is through the sciences, and yet there is not one single institution on this continent where a proper scientific education can be obtained." When he was president of the Pendleton Farmers Society in 1866, Mr. Clemson served on a committee whose purpose was to promote the idea of founding an institution for "educating the people in the sciences" and "which will in time secure permanent prosperity."

When he died on April 6, 1888, a series of events began that marked the start of a new era in higher education in the state of South Carolina, especially in the study of science, agriculture, and engineering. Mr. Clemson's passing set the stage for the founding of the university that bears his name—the beginning of a true "people's university," which opened the doors of higher education to all South Carolinians, rich and poor alike. In his will, Mr. Clemson bequeathed the Fort Hill plantation and a considerable sum from his personal assets for the establishment of an educational institution of the kind he envisioned. He left a cash endowment of approximately $80,000 as well as the 814-acre Fort Hill estate to South Carolina for such a college. The biggest obstacle in the creation of an agricultural college—the initial expense—was removed by Mr. Clemson's bequest.

In November 1889, Governor Richardson signed the bill accepting Thomas Clemson's gift. Soon after a measure was introduced to establish the Clemson Agricultural College, with its trustees becoming custodians of Morrill Act and Hatch Act funds made available for agricultural education and research by federal legislative acts. The founding of Clemson Agricultural College supplanted the South Carolina College of Agriculture and Mechanics, which had opened in Columbia in 1880.

Thomas Green Clemson came to the foothills of South Carolina when he married Anna Maria Calhoun, daughter of South Carolina's famous statesman John C. Calhoun.

Born in Philadelphia, Mr. Clemson was educated at schools both in the United States and France, where he attended lectures at the Royal School of Mines, studied with prominent scientists in the private laboratories of the Sorbonne Royal College of France, and received his diploma as an assayer from the Royal Mint in Paris. Mr. Clemson, then in his mid-20s, returned to America greatly influenced by his European studies. He became a great advocate of the natural sciences, achieving a considerable reputation as a mining engineer and a theorist in agricultural chemistry. He also was a gifted writer whose articles were published in the leading scientific journals of his day, an artist and a diplomat who represented the U.S. government as chargé d'affaires to Belgium for almost seven years.

Mr. Clemson had a lifelong interest in farming and agricultural affairs. He served as the nation's first superintendent of agricultural affairs (predecessor to the present secretary of agriculture position) and actively promoted the establishment and endowment of the Maryland Agricultural College in the 1850s. Though remembered today for these accomplishments, Thomas Clemson made his greatest historical contribution when, as a champion of formal scientific education, his life became intertwined with the destiny of educational and economic development in South Carolina. Although he never lived to see it, his dedicated efforts culminated in the founding of Clemson Agricultural College.

At the time of his death, Mr. Clemson was living at the Fort Hill homeplace, which today is a national historic landmark and provides a historic centerpiece for the Clemson University campus. He had inherited the house and plantation lands of his famous father-in-law, Senator Calhoun, upon the death of Mrs. Clemson in 1875.

Clemson College formally opened in July 1893, with an enrollment of 446. From the beginning, the college was an all-male military school. It remained this way until 1955, when the change was made to "civilian" status for students, and Clemson became a coeducational institution. In 1964, the college was renamed Clemson University as the state legislature formally recognized the school's expanded academic offerings and research pursuits.

On November 27, 1989, the University observed the 100th anniversary of the State's acceptance of the terms and conditions of Mr. Clemson's bequest.

The enrollment of Clemson has grown from 446 students at the opening of the University to 17,465 for the first semester 2000-2001. Since the opening of the University, 82,955 students have been awarded Bachelor's degrees. During this same period, 426 Associate degrees, 22,708 Master's, 2,108 Doctor of Philosophy, 87 Doctor of Education, and 294 Education Specialist degrees have been awarded, a total of 108,578 degrees.

Today, more than a century later, the University is much more than its founder ever could have imagined. With its diverse learning and research facilities, the University provides an educational opportunity not only for the people of the State, as Mr. Clemson dreamed, but for thousands of young men and women throughout the country and the world.

THE CAMPUS

The 1,400 acre University campus is sited on the former homestead of statesman John C. Calhoun. Nestled in the foothills of the Blue Ridge Mountains and adjacent to Lake Hartwell, the campus commands an excellent view of the mountains to the north and west, some of which attain an altitude of over 5,000 feet above mean sea level.

The Norfolk and Southern Railway and U.S. Highways 76 and 123 provide easy access to the City of Clemson and to the University. Oconee County Airport is four miles from the library. Both Atlanta and Charlotte are two hours driving time away.

Campus architecture is a pleasing blend of traditional and modern facilities enhanced by a beautiful landscape of towering trees, grassy expanses, and flowering plants. Academic, administrative, and student service buildings on campus represent an insured value of $627 million. Clemson University's real estate holdings include over 32,000 acres of forestry and agricultural lands throughout the state, the majority of which are dedicated to Clemson's research and public-service missions.

Fort Hill, the former home of John C. Calhoun inherited by Thomas Clemson, and the Hanover House are listed on the National Register of Historic Places and are open to the public. The campus also has two recognized Historic Districts.

The Strom Thurmond Institute houses the institute offices, Senator Thurmond's papers and memorabilia, and the special collections of the Cooper Library. The Institute is a part of an instructional and public-service district that includes the Brooks Center for the Performing Arts and the Madren Center for Continuing Education.

MISSION STATEMENT

The mission of Clemson University is to fulfill the convenant between its founder and the people of South Carolina to establish a "high seminary of learning" through its historical land-grant responsibilities of teaching, research, and extended public service.

Clemson University is a selective, public, land-grant university in a college-town setting along a dynamic southeastern corridor. The University is committed to world-class teaching, research, and public service in the context of general education, student development, and continuing education. Clemson's desire is to attract a capable, dedicated, and diverse student body of approximately 12,000 to 14,000 undergraduate and 4,000 to 5,000 graduate students, with priority to students from South Carolina.

Clemson offers a wide array of high quality baccalaureate programs built around a distinctive core curriculum. Graduate and continuing education offerings respond to the professions, while doctoral and research programs contribute to the economic future of the state, nation, and world. The University emphasizes agriculture, architecture, business, education, engineering, natural resources, science, and technology. The University also promotes excellence in education and scholarship in selected areas of the creative arts, health, human development, the humanities, and social sciences. In all areas, the goal is to develop students' communication and critical-thinking skills, ethical judgment, global awareness, and scientific and technological knowledge. Students remain the primary focus of the University.

Just as Clemson values its students, the University also values its faculty and staff who have committed their talents and careers to advance its mission. Clemson pledges to support their work, to encourage their professional development, to evaluate their professional performance, and to compensate them at nationally competitive levels.

ACCREDITATION

Clemson University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, GA 30033-4097; phone 404-679-4501) to award the Bachelor's, Master's, Specialist, and Doctor's degrees. Curricula are accredited by Accreditation Board for Engineering and Technology, American Assembly of Collegiate Schools of Business, American Council for Construction Education, Computing Science Accreditation Board, Human Factors and Ergonomics Society, International Association for Management Education, Landscape Architectural Accreditation Board, National Architectural Accrediting Board, National Association of Industrial Technology, National Association of State Directors of Teacher Education and Certification, National Council for Accreditation of Teacher Education, National League for Nursing, Planning Accrediting Board, and Society of American Foresters. Documentation of accreditation is available in the college deans' offices.

LIBRARIES

Clemson's main library, the Robert M. Cooper Library, is located at the center of campus and provides students with a variety of services and up-to-date collections. More than 1.6 million items are available as books, periodicals, microforms, government publications, and electronic materials.

Access to the Libraries' collections is provided through the Online Libraries Catalog, a part of the Libraries' CU Explorer system. To assist in finding journal and newspaper articles, the Libraries have provided access to a number of electronic indexes, several of them giving access to full-text journals online. CU Explorer is accessible from most computers on campus as well as through dial access. Among the regular services the Libraries offer are circulation, reference, interlibrary loan, class instruction, tours, and photocopiers. In addition, the Cooper Library houses two open computer laboratories maintained by DCIT.

In addition to the Cooper Library, the University Libraries include the Emery A. Gunnin Architectural Library in Lee Hall and the Special Collections Unit located in the Strom Thurmond Institute Building. These branch libraries contain materials dealing with the special nature of their programs. A small reading room containing periodical literature related to chemistry is located in the Hunter Chemistry Laboratory. Detailed information regarding facilities, hours of operation, loan privileges, policies, and fine regulations is available at the circulation and reference desks and on the Libraries' Web site at www.lib.clemson.edu.

COMPUTING FACILITIES

The Division of Computing and Information Technology (DCIT) supports the computing activities of students and employees with an extensive network of computers. DCIT maintains 41 computer labs throughout the campus, 13 of which are public access. The labs contain high-end PCs and laser printing equipment. Students have access to the Internet, electronic mail, word processing, and spreadsheet applications. DCIT also provides services through the Collaborative Learning Environment (CLE). The CLE facilitates the use of technology in teaching and research by offering a broad range of tools and resources. Access to CLE services for each course section is automatically maintained through the class enrollment system. Additional information is available on the Web at cle.clemson.edu.

Computer training is available to all students and employees as part of regular University courses, through short courses, and through special training programs. A complete list of services is available on the Web at dcit.clemson.edu.

CALHOUN HONORS COLLEGE

Established in 1962, Calhoun Honors College strives to enrich the educational experience of highly motivated, academically talented students by providing opportunities for scholarship and research not always available to undergraduates.

For entering freshmen, admission to Calhoun Honors College is by invitation, based on a combination of academic performance indicators, including high school grade point average, class rank, and SAT or ACT score. No one factor alone is sufficient for admission. In considering candidates, the Honors Office extends invitations to those students who show promise of meeting the high academic standards of Calhoun Honors College. In general, honors freshmen rank in the top five percent of their high school class, have a grade point average of 3.75 or higher, and present SAT scores of 1350 and higher.

Entering freshmen who do not receive an invitation to Calhoun Honors College may petition for admission if they meet at least two of the following minimum requirements: (1) high school GPA of 3.70, (2) class rank in the top ten percent, (3) SAT score of 1300 (or ACT score of 30). A complete petition consists of the Petition for Membership Form (available from the Honors Office), two letters of recommendation from high school guidance counselors or teachers, and a transcript of the student's high school academic record through the fall semester of the student's senior year.

Enrolled students may join the program if they have earned a cumulative grade-point ratio of 3.40 or better as full-time students at Clemson and have earned no more than 75 credit hours or have at least four semesters remaining in their degree programs. To continue membership in Calhoun Honors College, students must maintain a cumulative grade-point ratio of 3.40 or higher and must complete at least one honors course each semester.

The honors curriculum consists of two components. To earn General Honors students demonstrate breadth by completing at least four honors courses totaling at least 14 credit hours with no more than eight hours or two courses within that minimum in any one subject. These are usually 100–200-level courses that satisfy General Education requirements.

Normally undertaken in the junior and senior years, Departmental Honors provides opportunities for honors students to do advanced, in-depth study and research within their major academic disciplines. Specific requirements are set by the department, but all students are expected to complete a thesis, portfolio of creative works, major research project, or similar capstone achievement.

Students completing both General Honors and Departmental Honors are recognized at an awards ceremony on the eve of commencement, at which time they are presented the B. C. Inabinet Honors Medallion. This medallion, as well as the student's diploma, transcript, and commencement program, recognizes Honors graduates as Calhoun Honors College scholars.

In addition to the intellectual challenge of Honors, advantages of membership include priority course scheduling, honors housing (on a space-available basis), extended library loan privileges, and special lectures and cultural events.

Calhoun Honors College is institutionally responsible for administering the Dixon Fellows Program which helps students prepare to compete for Rhodes, Marshall, Truman, Fulbright, and other prestigious extramural fellowships.

COOPERATIVE EDUCATION

The Cooperative Education Program is a planned program in which students combine alternate periods of academic study and periods of related work with a participating business, industry, agency, or organization. Work periods normally take place during the sophomore and junior years (including summers), while the freshman and senior years are spent in full-time study.

Students qualify for participation in the Cooperative Education Program by satisfactory completion of 30 semester hours of academic work. Transfer students may qualify in one semester. Three, four, or five co-op work periods are projected and included in each student referral. Usually two students from the same academic area are paired to fill a full-time work position.

Students enrolled in the Cooperative Education Program pay a nominal registration fee each semester or summer session which coincides with their work period. That fee enables students to maintain student status and participate in student activities and services that are normally associated with enrollment at the University. However, the fee does not cover the cost of tuition for academic courses, health service, or any of the other benefits normally associated with the standard University fee. In responding to insurance, tax, loans, and other questionnaires about status, the University classifies a student on work assignment as a full-time continuing student. The work assignment is considered an integral part of the student's education, but no academic credit is awarded for this experience.

STUDY AND WORK ABROAD PROGRAMS

Through the Office of International Services and Diversity Programs, students can choose from a variety of programs offered overseas. Programs are varied to fulfill the needs of most students and include the Agriculture Exchange Program in Aberdeen, Scotland; the engineering exchange and summer program at the University of Bristol in England; and

the language and international trade exchange and summer programs in Mexico, Ecuador, France, Germany, and Spain. Exchange and summer programs abroad are offered in Australia, Belgium, Chile, Czech Republic, Ecuador, England, France, Germany, Japan, Mexico, Scotland, Spain, and more. Both Clemson Programs Abroad and the International Student Exchange Program (ISEP) allow students to enroll, pay tuition, fees, and room and board directly to Clemson while they study abroad. With the ISEP Program, students can study for a semester or an academic year at one of more than 80 institutions world-wide. Transfer credit usually applies within the major with prior academic department approval. Financial aid and scholarships may also transfer for many of the Clemson programs abroad.

Students who study abroad gain valuable experience. Internships and work abroad programs are also available. Applications are usually due in October for spring programs, in February for fall and academic year programs, and in April for summer programs. Interested students should contact the Study Abroad Advisor in E-306 Martin Hall at the beginning of each semester.

RESERVE OFFICERS TRAINING CORPS

Air Force and Army

The Departments of the Army and the Air Force maintain ROTC units at Clemson University. Their mission is to produce officers of high quality for technical and nontechnical careers in the U.S. Army and Air Force. Two- and four-year programs are available. The four-year program consists of the basic course for freshmen and sophomores and the advanced course for juniors and seniors.

Scholarships, available to selected ROTC students, pay for tuition, books, and laboratory expenses, in addition to $200 per month during the school year. Nonscholarship advanced cadets also receive $200 per month. Basic course credit may be awarded to students having prior military service.

Selected advanced Air Force cadets receive flight training at government expense. Reserve or National Guard duty can be guaranteed by the U.S. Army.

Cadets who complete the Advanced or Professional Course and satisfy commissioning requirements are appointed Second Lieutenants. Ample opportunity exists for graduate study in both services, with temporary deferments possible.

HONOR ORGANIZATIONS

Clemson University has a number of academic honorary societies which recognize outstanding scholarship by students, faculty, and staff. These include the following:

Alpha Epsilon Delta (Biology)
Alpha Lambda Delta (Freshman)
Alpha Pi Mu (Industrial Engineering)
Beta Alpha Psi (Accounting)
Beta Gamma Sigma (Business Majors)
Calhoun Society (Honors College)
Chi Epsilon (Civil Engineering)
Golden Key (Honor Society)
Mu Beta Psi (Music)
Omicron Delta Kappa (Juniors and Seniors)
Order of Omega (Greek)
Phi Kappa Phi
Phi Sigma Pi (Honorary)
Psi Chi (Psychology)
Rho Phi Lambda (Parks, Recreation, and Tourism Management)
Sigma Xi
Tau Beta Pi
Xi Sigma Pi (Forestry)

AGRICULTURE AND FORESTRY RESEARCH

Since 1886, researchers in Agriculture and Forestry Research (AFR) have been addressing the problems of agriculture, agribusiness, and the physical and social environment. In addition to the major activities of AFR on the Clemson University campus, research facilities are located in Blackville, Florence, Charleston, Columbia, and Georgetown.

The mission of AFR is to develop knowledge through research that will provide information South Carolina citizens need to make intelligent decisions related agriculture, forestry, natural resources, and the environment. Scientists cooperate with researchers in other states and throughout the world to create a better standard of living for South Carolinians by enhancing their use of natural resources. Over the years, scientists have worked in food development and improvement, farming techniques, and packaging of biological materials. They continue to work in the new scientific areas of genetic engineering and computer information.

AFR has an annual budget of more than $32 million which supports the efforts of over 165 research faculty and almost 300 support personnel. Graduate students use AFR facilities in their research and educational programs.

CLEMSON UNIVERSITY FOUNDATION

The Clemson University Foundation is a nonprofit organization which solicits, manages, and administers gifts from private sources to the academic programs at Clemson University.

Originally chartered in 1933, the foundation is a primary component of the Advancement Program at the University. There are 36 voting members of the Board of Directors who oversee the Foundation's activities. Currently 32 of the 36 elected directors are alumni of the University. Other voting directors include the President and Vice President of the Alumni Association and the Alumni National Council and President and Vice President of IPTAY. The President of the University, Vice President for Advancement, and the Chief Alumni and Development Officers serve as ex-officio directors. The Director of Gift and Asset Management serves as treasurer, and the Director of Advancement Services serves as secretary. The Vice President for Advancement serves as the Executive Vice President for the Foundation. Also represented on the Board are the Provost, a deans' representative, and the President of the Faculty Senate.

The Foundation operates through an effective committee structure that reports through an executive committee to the full board. An administrative division directs its attention to real estate, investments, policy and bylaws, and budget and nominations. A fund-raising division is managed by the Campaign Executive Committee which is responsible for the Clemson Fund, planned gifts, major gifts, and corporate and foundation solicitation. Working directly with the executive committee is the Clemson Real Estate Foundation. Market value of the Foundation's assets as of June 2000 was approximately $265 million plus some $5 million in real estate holdings.

CLEMSON ALUMNI ASSOCIATION

The Clemson Alumni Association has been recognized as one of the top such organizations in the country. The Alumni Association's mission includes service, involvement, and information. The Association stresses service to more than 90,000 alumni and to a student body of more than 17,000. Regular programs designed to strengthen the loyalty and interest alumni have for their Alma Mater are conducted on and off campus. Clemson Clubs are located across the world, and Clemson graduates are located in every state and most foreign countries. Reunions, student alumni programs, constituency programs, and young alumni programs form the basis for an array of services to benefit Clemson and its alumni.

All services of the National Alumni Association are coordinated out of offices located in the Clemson Alumni Center, a campus focal point built, furnished, and equipped entirely by gifts from alumni especially for that purpose. The University's Visitors Center, a gift of the Class of '44, is adjacent to the Alumni Center and is a perfect "first stop" for anyone visiting or returning to campus. Records of addresses, employment, and biographical information are kept on alumni as well as on thousands of former students who wish to be involved with the University and its alumni program.

A regular publication program keeps active alumni, friends, and parents aware of Clemson's programs in teaching, research, and public service. The *Clemson World* magazine is published quarterly.

Traditional programs such as the Alumni Distinguished Service Awards, professorships, Philip H. Prince Alumni Presidential Scholars, Jervey Scholars, R. F. Poole Scholars, and awards for distinguished teaching, outstanding research, and public service are recognized as the most prestigious of their kind on campus.

ADMISSION

APPLICATION FORMS AND DATES

Application forms may be obtained by writing the Office of Admissions, Clemson University, 105 Sikes Hall, Box 345124, Clemson, SC 29634-5124. Application forms and catalogs for all 2002 entry dates are available beginning September 2001. Preliminary application forms are available anytime for those who wish to be included in the September mailing. Freshman candidates are especially encouraged to submit preliminary applications and sit for the SAT I or ACT during the spring semester of their junior year. Copies of both the preliminary application and the application for admission are available on the Web at www.clemson.edu.

Candidates should understand that admission is closed when all classroom space has been committed. The majority of freshman admission decisions are reached during the period November through March. Transfer students seeking entrance in August are usually notified between February and July. Candidates must submit a nonrefundable fee of $40 with their application. This fee is not applicable toward tuition and/or other University fees.

Deadlines for submitting an application follow:

	Freshmen	Transfers
Fall Semester	May 1	July 1
Spring Semester	December 15	December 1

Transfer student deadlines for submitting official transcripts (except for current term) are as follows:

Fall Semester—July 15
Spring Semester—December 15

FRESHMEN

Admission to the University is competitive and is based primarily upon high school curriculum, grades, class standing, and SAT I or ACT scores. An applicant's intended major and state residency also receive consideration. To apply for admission, a candidate must submit a high school transcript through his/her counselor and have results of the SAT I or ACT sent directly from the testing agency. In addition, all applicants for freshman admission should complete the following courses in high school:

English—4 credits
All four courses must have strong grammar and composition components, with at least one in English literature and at least one in American literature. College preparatory English I, II, III, and IV will meet these requirements.

Mathematics—3 credits
These include algebra I (for which applied mathematics I and II may count together as a substitute if a student successfully completes algebra II), algebra II and geometry.

Laboratory Science—3 credits
Two must be selected from biology I, chemistry I, or physics I.

Foreign Language—3 credits
All three must be earned in the same language.

Social Sciences—3 credits
American history is required. One half credit of government and one half credit of economics are also recommended.

Physical Education/ROTC—1 credit

Other—2 credits
One of these must be a fourth year of mathematics, laboratory science, or foreign language. Students interested in engineering are strongly encouraged to take a fourth year of mathematics. This course should be selected from precalculus, calculus, statistics, or discrete mathematics. The second credit must be in advanced mathematics, computer science, or a combination of these; or one unit of world history, world geography, or western civilization.

The SAT I or ACT examination scores, rank in class, academic preparation, and recommendation of the high school counselor will be weighed carefully in the decision-making process. The applicant's acceptance will be confirmed upon presentation of a final high school transcript indicating continued academic progress and graduation.

Entrance Examinations

All freshman candidates and some transfer students must submit scores from either the SAT I or ACT. For August enrollment, it is recommended that students complete the SAT I or ACT no later than the preceding December. Registration materials for these tests are readily available at high schools or can be obtained by contacting the College Board (609) 771-7600 or (800) SAT-SCOR, or the American College Testing Service (319) 337-1313. All candidates must have their scores reported to Clemson by contacting the appropriate testing agency. The College Board's institutional code for Clemson is 5111. The ACT code for Clemson is 3842. Photocopies of student test reports or those submitted by third parties, such as high schools and colleges, are not accepted.

International Baccalaureate (IB) Credit Policy

Clemson University endorses the International Baccalaureate (IB) Program and awards credit for IB Higher Level scores as indicated below.

College Board Advanced Placement Program

The College Board Advanced Placement Program (AP) gives highly motivated high school students an opportunity to begin their college careers dur-

IB Higher Level Examination	Level Grade	Credit Allowed Toward Degree	Credits
Art/Design	4, 5, 6, 7	ART 103	3
Biology	5, 6	BIOL 103, 104, *or* BIOL 101, 102	8
	7	BIOL 110, 111	10
Business and Organization	5, 6, 7	MGT 301	3
Chemistry	5, 6, 7	CH 101 (for majors requiring organic chemistry)	4
	5	CH 101 (for majors not requiring organic chemistry)	4
	6, 7	CH 101, 102 (for majors not requiring organic chemistry)	8
Economics	5, 6, 7	ECON 211	3
English (Language A)	5, 6, 7	ENGL 208	3
	5, 6, 7	ENGL 101[1]	3
Foreign Language	4	FR 101, GER 101, ITAL 101, JAPN 101, RUSS 101, *or* SPAN 101	4
	5, 6, 7	FR 101, 102, GER 101, 102, ITAL 101, 102, JAPN 101, 102, RUSS 101, 102 *or* SPAN 101, 102	8
History-European	5, 6, 7	HIST 173	3
History-Americas	5, 6, 7	HIST 101 and 102	6
Mathematics	5	MTHSC 106[2]	4
	6, 7	MTHSC 106	4
Music	5, 6, 7	Determined on individual basis	
Psychology	5, 6, 7	PSYCH 201	3
Theatre Arts	5, 6, 7	Determined on individual basis	

[1]For students with a 5, 6, or 7 score, credit will be awarded based on a written examination administered by the English Department.

[2]For students taking the calculus sequence, MTHSC 106 and 108. Upon completion of MTHSC 108 with a grade of C or better, credit will be given for MTHSC 106.

ing the last year or two of high school. AP participants take college-level courses in high school, sit for nationally administered examinations in the subjects concerned, and submit test grades to Clemson for credit. Credit is awarded to those earning grades of 3, 4, or 5 on AP exams.

Placement Tests

Mathematics Placement—Freshmen mathematics placement is determined by the applicant's score on one of the following tests: Clemson Mathematics Placement Test, College Board Advanced Placement (AP) Examination in Calculus or Statistics, or the International Baccalaureate (IB) Higher Level Mathematics Examination. Failure to sit for one of these exams will result in placement in preparatory work that, in most cases, will not apply toward the freshman mathematics requirement.

Foreign Language Placement—Applicants desiring advanced placement in a foreign language may take the College Board's SAT II Subject Tests, Advanced Placement (AP) Examinations, or the International Baccalaureate (IB) Higher Level Examination. The Department of Languages also offers placement exams which students may take during summer orientation. SAT II scores of 450 or higher enable students to exempt one or more language courses. These students will receive credit following the successful completion (grade of C or higher) of a qualifying course at Clemson.

College Board Advanced Placement Examination		AP Grade	Credit Allowed Toward Degree	Credits
ECONOMICS	Microeconomics	3, 4, 5	ECON 211	3
	Macroeconomics	3, 4, 5	ECON 212	3
ENGLISH	Composition and Literature	3, 4	ENGL 101	3
		5	ENGL 101, 102	6
	Language and Composition	3, 4	ENGL 101	3
		5	ENGL 101, 102	6
	Both Tests	3, 4 on each	ENGL 101, 102	6
GOVERNMENT	American Government	3, 4, 5	PO SC 101	3
	Comparative Government	3, 4, 5	PO SC 102	3
HISTORY/ GEOGRAPHY	American History	3, 4, 5	HIST 101, 102	6
	European History	3, 4, 5	HIST 173	3
	Human Geography	3	GEOG 101	3
HUMANITIES	Music Theory	3, 4, 5	MUSIC 205, 206	6
	Music Literature	3, 4, 5	MUSIC 210	3
	Art History	3, 4, 5	A A H 210	3
	Studio Drawing	3, 4, 5	ART 205	3
	General Studio	3, 4, 5	ART 103	3
LANGUAGES	French Language	3, 4, 5	FR 101, 102	8
	French Literature	3	FR 101, 102	8
		4	FR 101, 102, 201	11
		5	FR 101, 102, 201, 202	14
	German Language	3, 4, 5	GER 101, 102	8
	Latin (either test)	3	LATIN 101, 102, 201	11
		4, 5	LATIN 101, 102, 201, 202	14
	Spanish Language	3, 4, 5	SPAN 101, 102	8
	Spanish Literature	3	SPAN 101, 102	8
		4	SPAN 101, 102, 201	11
		5	SPAN 101, 102, 201, 202	14
MATHEMATICS	Calculus AB	3, 4, 5	MTHSC 106	4
	Calculus BC	3, 4, 5	MTHSC 106, 108	8
	Statistics	3, 4	MTHSC 203	3
		5	MTHSC 101, 203	6
PSYCHOLOGY	Psychology	3, 4, 5	PSYCH 201	3
SCIENCE	Biology	3	BIOL 103, 104	8
		4, 5	BIOL 110, 111	10
	Chemistry	3, 4, 5	CH 101, 102	8
	Computer Science A	3, 4, 5	CP SC 101	4
	Computer Science AB	3, 4[1]	CP SC 101	4
	Computer Science AB	5	CP SC 101, 102	8
	Environmental Science	3, 4, 5	EN SP 200	3
	Physics B[2]	3, 4, 5	PHYS 207, 208	8
	Physics C (Mechanics)	3, 4, 5	PHYS 122, 124	4
	Physics C (Electrical and Magnetism)	3, 4, 5	PHYS 221, 223	4

[1]Students earning a grade of 4 on Computer Science may request a personal interview with a departmental representative to determine whether credit will be given for CP SC 102.

[2]Students enrolling in curricula requiring calculus-based physics (PHYS 122, 221, 222, 223, 224), but who earn a grade of 5 on Physics B, will be asked to meet with a departmental representative for further evaluation and placement counseling.

GED

Candidates submitting General Educational Development (GED) credentials in lieu of a high school diploma must be 19 years of age or older. Official GED score results must be received directly from the General Educational Development Testing Service along with an official copy of the high school transcript and SAT I or ACT scores. Applicants presenting the GED will be reviewed by the Admissions Exceptions Committee.

Appeals

Any freshman or transfer candidate who is denied admission may appeal for reconsideration provided the student (1) presents new information, such as improved grades and/or class rank, improved SAT I or ACT scores, or SAT II Subject Test scores; and (2) submits a letter outlining the rationale for the appeal. All appeals will be reviewed by the Office of Admissions. In some instances, appeals will be referred to the Admissions Exceptions Committee.

Admissions Exceptions

If it is not possible to make a positive decision on the basis of previous academic performance and SAT I or ACT scores, other factors, such as special talents or high school profile, may be considered. Where appropriate, the Office of Admissions will refer such cases to the Admissions Appeals Committee. Student-athletes who do not meet regular admissions standards may be admitted if they meet Atlantic Coast Conference (ACC) and National Collegiate Athletic Association (NCAA) eligibility requirements.

Conditional Admission

Freshman students who are accepted to and enrolled in Clemson University in a conditional admissions program must meet the conditions of their admission or be subject to disenrollment.

TRANSFER STUDENTS

Transfer admission is becoming more competitive. To increase their chances for admission, potential students should have the following qualifications:

- completion of a year of college study with 30 semester hours (or 45 quarter hours) of transferable credit,
- a minimum 2.5 grade-point ratio (3.0 preferred),
- freshman level math, science, and English requirements for the intended major at Clemson.

Application deadlines are December 1 for consideration for the spring semester and July 1 for consideration for the fall semester. In most cases, admission decisions will be made once the year of college study is completed. Summer school applicants should have all credentials sent at least two weeks prior to the beginning of the term. Admission is closed when all classroom space has been committed.

Transfer Credit

Coursework completed with a grade of C or higher at other regionally accredited institutions, including correspondence courses, telecourses, and exempted courses, will be evaluated for transfer in terms of equivalent courses included in the Clemson curriculum of the student's choice. This does not guarantee that all courses taken at other institutions will be accepted for transfer. The acceptability of each course or exemption will be based on an evaluation by the faculty concerned. Coursework earned at different institutions will not be joined to equate with one Clemson course. No course taken at a nonbaccalaureate-degree granting institution may be used as an equivalent or substitute for any 300- or 400-level Clemson course.

Learning experiences including, but not limited to, military service schools, non-collegiate sponsored instruction, work related experiences, etc. will not be evaluated for transfer; however, enrolled students may request credit by examination from the appropriate department for any non-transferable learning experience. For additional information, see *Advanced Placement and Credit by Examination* on page 22.

Students transferring may select the curriculum that was outlined in the *Clemson University Undergraduate Announcements* at the time they entered the sending institution, provided they have been in continuous enrollment. Further, transfer students may select any curriculum adopted subsequent to that initial curriculum. After enrolling at Clemson, if transfer students change from one major to another, they will complete all of the requirements included in the new curriculum that are in effect at the time of the change. If all work toward a degree is not completed within six years after the initial enrollment at the sending institution, the student may be required to take additional courses.

Transfer: State Policies and Procedures

Section 10-C of the South Carolina School-to-work Transition Act (1994) stipulates that the Council of College and University Presidents and the State Board for Technical and Comprehensive Education operating through the Commission on Higher Education, shall develop better articulation of associate and baccalaureate degree programs. To comply with this requirement, the Commission upon the advice of the Council of Presidents established a Transfer Articulation Policy Committee composed of four-year institutions' vice presidents for academic affairs and the Associate Director for Instruction of the State Board for Technical and Comprehensive Education. The principal outcomes derived from the work of that committee and accepted by the Commission on Higher Education on July 6, 1995 were

- an expanded list of 72 courses which will transfer to four-year public institutions of South Carolina from the two-year public institutions,
- a statewide policy document on good practices in transfer to be followed by all public institutions of higher education in the State of South Carolina, which was accepted in principle by the Advisory Committee on Academic Programs and the Commission,
- six task forces on statewide transfer agreements, each based in a discipline or broad area of the baccalaureate curriculum.

In 1995 the General Assembly passed Act 137 which stipulated further that the South Carolina Commission on Higher Education "notwithstanding any other provision of law to the contrary, shall have the following additional duties and functions with regard to the various public institutions of higher education." These duties and responsibilities include the Commission's responsibility to "establish procedures for the transferability of courses at the undergraduate level between two-year and four-year institutions or schools."

Act 137 directs the Commission to adopt procedures for the transfer of courses from all two-year public to all four-year public institutions of higher education in South Carolina. Proposed procedures are listed below. Unless otherwise stated, these procedures shall become effective immediately upon approval by the Commission and shall be fully implemented, unless otherwise stated, by September 1, 1997.

Statewide Articulation of 72 Courses

1. The Statewide Articulation Agreement of 72 courses already approved by the South Carolina Commission on Higher Education for transfer from two- to four-year public institutions (See *Appendix A*) shall be applicable to all public institutions, including two-year institutions and institutions within the same system. In instances where an institution does not have synonymous courses to ones on this list, it shall identify comparable courses or course categories for acceptance of general education courses on the statewide list.

Admissions Criteria, Course Grades, GPAs, Validations

2. All four-year public institutions shall issue annually in August a transfer guide covering at least the following items:

A. The definition of a transfer student and requirements for admission both to the institution and, if more selective, requirements for admission to particular programs.

B. Limitations placed by the institution or its programs for acceptance of standardized examinations (e.g., SAT, ACT) taken more than a given time ago, for academic coursework taken elsewhere, for coursework repeated due to failure, for coursework taken at another institution while the student is academically suspended at his/her home institution, and so forth.

C. Institutional and, if more selective, programmatic maximums of course credits allowable in transfer.

D. Institutional procedures used to calculate student applicants' GPAs for transfer admission. Such procedures shall describe how nonstandard grades (withdrawal, withdrawal failing, repeated course, etc.) are evaluated; and they shall also describe whether all coursework taken prior to transfer or just coursework deemed appropriate to the student's intended four-year program of study is calculated for purposes of admission to the institution and/or programmatic major.

E. Lists of all courses accepted from each technical college (including the 72 courses in the Statewide Articulation Agreement) and the course equivalencies (including "free elective" category) found on the home institution for the courses accepted.

F. Lists of all articulation agreements with any public South Carolina two-year or other institution of higher education together with information about how interested parties can access these agreements.

G. Lists of the institution's Transfer Officer(s) personnel together with telephone and FAX numbers and office address.

H. Institutional policies related to "academic bankruptcy" (i.e. removing an entire transcript or parts thereof from a failed or underachieving record after a period of years has passed) so the re-entry into the four-year institution with course credit earned in the interim elsewhere is done without regard to the student's earlier record.

I. "Residency requirements" for the minimum number of hours required to be earned at the institution for the degree.

3. Coursework (individual courses, transfer blocks, statewide agreements) covered within these procedures shall be transferable if the student has completed the coursework with a "C" grade (2.0 on a 4.0 scale) or above, but transfer of grades does not relieve the student of the obligation to meet any GPA requirements or other admissions requirements of the institution or program to which application has been made.

A. Any four-year institution which has institutional or programmatic admissions requirements for transfer students with cumulative grade point averages (GPAs) higher than 2.0 on a 4.0 scale shall apply such entrance requirements equally to transfer students from regionally accredited South Carolina pubic institutions regardless of whether students are transferring from a four-year or two-year institution.

B. Any multi-campus institution or system shall certify by letter to the Commission that all coursework at all of its campuses applicable to a particular degree program of study is fully acceptable in transfer to meet degree requirements in the same degree program at any other of its campuses.

4. Any coursework (individual courses, transfer blocks, statewide agreements) covered within these procedures shall be transferable to any public institution without any additional fee and without any further encumbrance such as a "validation examination," "placement examination/instrument," "verification instrument," or any other stricture, notwithstanding any institutional or system policy, procedure, or regulation to the contrary.

Transfer Blocks, Statewide Agreements, Completion of the AA/AS Degree

5. The following Transfer Blocks/Statewide Agreements taken at any two-year public institution in South Carolina shall be accepted in their totality toward meeting baccalaureate degree requirements at all four-year public institutions in relevant four-year degree programs, as follows:

- Arts, Humanities, and Social Sciences—established curriculum block of 46–48 semester hours,
- Business Administration—established curriculum block of 46–51 semester hours,
- Engineering—established curriculum block of 33 semester hours,
- Science and Mathematics—established curriculum block of 48–51 semester hours,

- Teacher Education—established curriculum block of 38–39 semester hours for Early Childhood, Elementary, and Special Education students only. Secondary education majors and students seeking certification who are not majoring in teacher education should consult the Arts, Humanities, and Social Sciences or the Math and Science transfer blocks, as relevant, to assure transferability of coursework.
- Nursing—by statewide agreement, at least 60 semester hours shall be accepted by any public four-year institution toward the baccalaureate completion program (BSN) from graduates of any South Carolina public associate degree program in nursing (ADN), provided that the program is accredited by the National League of Nursing and that the graduate has successfully passed the National Licensure Examination (NCLEX) and is a currently licensed Registered Nurse.

(For complete texts and information about these statewide transfer blocks/agreements, see *Appendix B.*)

6. Any "unique" academic program not specifically or by extension covered by one of the statewide transfer blocks/agreements listed in #4 above shall either create its own transfer block of 35 or more credit hours with the approval of CHE staff or shall adopt either the Arts/Social Science/Humanities or the Science/Mathematics block by September 1996. The institution at which such program is located shall inform the staff of the CHE and every institutional president and vice president for academic affairs about this decision.

7. Any student who has completed either an Associate of Arts or Associate of Science degree program at any public two-year South Carolina institution which contains within it the total coursework found in either the Arts/Social Sciences/Humanities Transfer Block or the Math/Science Transfer Block shall automatically be entitled to junior-level status or its equivalent at whatever public senior institution to which the student might have been admitted. (*Note:* As agreed by the Committee on Academic Affairs, junior status applies only to campus activities such as priority order for registration for courses, residence hall assignments, parking, athletic event tickets, etc. and not in calculating academic degree credits.)

Related Reports and Statewide Documents

8. All applicable recommendations found in the Commission's report to the General Assembly on the School-to-work Act (approved by the Commission and transmitted to the General Assembly on July 6, 1995) are hereby incorporated into the procedures for transfer of coursework among two- and four-year institutions. (See *Appendix C.*)

9. The policy paper entitled *State Policy on Transfer and Articulation*, as amended to reflect changes in the numbers of transfer blocks and other Commission action since July 5, 1995, is hereby adopted as the statewide policy for institutional good practice in the sending and receiving of all course credits to be transferred. (See *Appendix D.*)

Assurance of Quality

10. All claims from any public two- or four-year institutions challenging the effective preparation of any other public institution's coursework for transfer purposes shall be evaluated and appropriate measures shall be taken to reassure that the quality of the coursework has been reviewed and approved on a timely basis by sending and receiving institutions alike. This process of formal review shall occur every four years through the staff of the Commission on Higher Education, beginning with the approval of these procedures.

Statewide Publication and Distribution of Information on Transfer

11. The staff of the Commission on Higher Education shall print and distribute copies of these Procedures upon their acceptance by the Commission. The staff shall also place this document and the Appendices on the Commission's home page on the Internet under the title "Transfer Policies."

12. By September 1 of each year, all public four-year institutions shall on their own home page on the Internet under the title "Transfer Policies"

A. Print a copy of this entire document (without appendices).

B. Print a copy of their entire transfer guide.

C. Provide to the staff of the Commission in satisfactory format a copy of their entire transfer guide for placing on the Commission's home page on the Internet.

13. By September 1 of each year, the staff of the State Board for Technical and Comprehensive Education shall on its home page on the Internet under the title "Transfer Policies"

A. Print a copy of this document (without appendices).

B. Provide to the Commission staff in format suitable for placing on the Commission's home page on the Internet a list of all articulation agreements that each of the sixteen technical colleges has with public and other four-year institutions of higher education, together with information about how interested parties can access those agreements.

14. Each two-year and four-year public institutional catalog shall contain a section entitled "Transfer: State Policies and Procedures." Such section at a minimum shall

A. Publish these procedures in their entirety (except appendices).

B. Designate a chief Transfer Officer at the institution who shall

—provide information and other appropriate support for students considering transfer and recent transfers.

—serve as a clearinghouse for information on issues of transfer in the State of South Carolina.

—provide definitive institutional rulings on transfer questions for the institution's students under these procedures.

—work closely with feeder institutions to assure ease in transfer for their students.

C. Designate other programmatic Transfer Officer(s) as the size of the institution and the variety of its programs might warrant.

D. Refer interested parties to the institutional Transfer Guide.

E. Refer interested parties to the institution's and the Commission on Higher Education's home pages on the Internet for further information regarding transfer.

In order to comply with these state guidelines, the following information is noted relative to Clemson University:

Transfer Admissions Officers
Becky D. Pearson, Assistant Director of Admissions
Kathryn Rice, Transfer Credit Coordinator

105 Sikes Hall
Clemson University
Box 345124
Clemson, SC 29634-5124
Phone: (864) 656-2287
FAX: (864) 656-2464

Additional information regarding transfer is contained in the brochure *S. C. Technical College Transfer Guide*, available through the Office of Undergraduate Admissions at the address above. Prospective transfer students are also encouraged to refer to the University's Web site at www.clemson.edu or the South Carolina Commission on Higher Education's Web site at che400.state.sc.us.

College Board College-Level Examination Program (CLEP)

This program has very limited recognition at Clemson. A few departments accept credit for CLEP subject-matter examinations; however, CLEP General Examinations are not recognized. Credit is awarded for introductory-level courses according to criteria established by the following departments: Chemistry, English (composition only), and Mathematical Sciences (algebra and trigonometry only—applicable principally in agricultural curricula permitting use of MTHSC 105). Numerical scores plus essays, required when offered as part of a CLEP examination, will be evaluated by the appropriate department. CLEP is designed primarily for adults with nontraditional learning experiences.

ADMISSIONS DEPOSIT

With the exception of certain University scholarship recipients, all accepted freshman and transfer candidates are required to submit a nonrefundable $100 admissions deposit. This deposit is applicable toward tuition and other University fees.

HOUSING

All 2001-2002 entering freshmen are guaranteed on-campus housing. The University housing policy requires all freshmen to live in University housing, in their own home, or with a close relative unless circumstances dictate otherwise. New transfer students entering Clemson in 2001 will be offered University housing only if space is available.

ORIENTATION PROGRAMS

The University offers a series of orientation programs during the summer for freshmen, transfer students, and their parents. All accepted students are expected to attend one of the sessions. During orientation, students will have an opportunity to discuss their educational objectives with an advisor, to register for the fall semester, and to learn about student life and other co-curricular activities. Transfer students will have their transcripts evaluated and select appropriate courses for their first semester at Clemson. The student program fee is $55 per student, subject to change.

The 2001 summer orientation dates for freshmen are June 18–19, 21–22, 25–26, 28–29, July 2–3, 9–10, and 12–13. New transfer students may attend either the June 20 or July 11 program. Although students are strongly encouraged to attend summer orientation, abbreviated make-up sessions are held on August 19 for freshmen and their parents and on August 20 for transfer students and their parents.

CAMPUS VISITS AND TOURS

The Visitors Center serves as a "front door" to the campus and offers a variety of informational services, including guided tours, audio-visuals, general and referral information, and publications about the University and surrounding area. The Visitors Center is located adjacent to the Alumni Center at the end of North Palmetto Boulevard. Hours of operation are Monday–Friday from 8:00 A.M. to 4:30 P.M., Saturday from 9:00 A.M. to 4:30 P.M., and Sunday from 1:00 P.M. to 4:30 P.M. The Visitors Center is closed on University holidays.

Guided walking tours of the campus, which last about one and one-half hours, are led by students who are members of the all-volunteer University Guide Association. Tour times are Monday–Saturday at 9:45 A.M. and 1:45 P.M. and Sunday at 1:45 P.M. Tours begin and end at the Visitors Center. Visitors should try to arrive 10–15 minutes early. Tours are offered throughout the year except on University holidays. Reservations are accepted, and it is recommended you call with your specific date. For current information, call (864) 656-4789 or check the Web site at www.clemson.edu.

INTERNATIONAL UNDERGRADUATES

Admissions services for undergraduate international students are provided by the Office of Undergraduate Admissions. International students who come from abroad or transfer from another school must meet academic, language and financial qualifications as determined by Clemson University. The SAT I or ACT is required of all international applicants (freshman or transfer). The Test of English as a Foreign Language (TOEFL) is required of applicants from countries where English is not the native language. Financial qualifications are determined by the submission of financial assessment and bank statements verifying adequate funding. Student visa services are provided by the Office of the Graduate School.

SPECIAL STUDENT STATUS

The special student classification is designed for high school graduates 19 years of age or older, who wish to take a limited number of courses for personal or professional development. This program is not appropriate for individuals who are interested in earning an undergraduate degree. In addition, it is not a "trial admission" status or one for candidates who apply too late to submit credentials for consideration for regular admission. Applicants denied regular admission to Clemson are not eligible to apply as special students.

None of the usual credentials supporting an application are required of such applicants. A maximum of 18 undergraduate credit hours can be taken during the regular or summer sessions.

READMISSION OF FORMER UNDERGRADUATES

Undergraduate students who have previously attended Clemson and wish to return must secure an application for reentrance from the Registrar's Office. Students are readmitted into the major they were in when they last attended Clemson. Change of major forms are available in the Student Records Office. Former students must meet the catalog curriculum requirements for graduation in effect at the time of their return. Students are required to satisfy the University's general education requirements in addition to curricular requirements. Any variations in curricular requirements will be considered under the substitution procedures. If all work toward a degree is not completed within six years after entrance, the student may be required to take additional courses. Other information can be obtained from the Registrar's Office.

POSTBACCALAUREATE

Students may be accepted by the Graduate School as postbaccalaureate if they apply to a graduate degree program but do not have the appropriate academic background. Students must be recommended by the appropriate department or program chair and should meet all other requirements for admission to the degree program with respect to grade-point ratio and standardized test scores. Postbaccalaureate students who are denied admission because of failure to meet the minimum requirements have access to the same appeal procedure as any other students applying to the Graduate School.

Applicants will be classified as postbaccalaureate if they are not qualified to take at least one graduate course per semester which can be included in the minimum hours required for the graduate degree. Additionally, students required to complete eighteen or more semester hours of undergraduate credits will be classified as postbaccalaureate. The postbaccalaureate status will remain in effect until the number of required undergraduate credit hours is less than or equal to eighteen and the student is qualified to take, each semester, a graduate course which can be included in the minimum hours required for the graduate degree. Departments or students may request postbaccalaureate status even though the above criteria are satisfied.

Once postbaccalaureate students become eligible for classification as graduate students, the decision as to eventual admission status (full or provisional) will be made based on criteria utilized by the department and Graduate School for all other applicants to the degree program. Postbaccalaureate students are expected to maintain a *B* average and receive no grade lower than *C* to qualify for admission to a graduate program.

Postbaccalaureate students can enroll in the same number of credits per semester as undergraduate students but cannot enroll in graduate courses or receive graduate assistantships. No degree or certificate shall be awarded to students in a postbaccalaureate status, and such students who subsequently wish to obtain an additional baccalaureate degree must apply through the Office of Undergraduate Admissions. The applicability of credits earned toward the undergraduate degree will be determined by the policy pertaining to transfer students. Tuition and fees for postbaccalaureate students shall be those applicable to undergraduate students and are subject to out-of-state fees, if applicable.

Students possessing undergraduate degrees or graduate degrees who wish to enroll in undergraduate courses for reasons other than future admission to the Graduate School shall not be classified as postbaccalaureate and shall be governed by policies established by the Office of Admissions.

FINANCIAL INFORMATION

The annual State Appropriation Act imposes the general requirement that student fees be fixed by the University Board of Trustees. The Act imposes two specific requirements on the Board: (1) In fixing fees applicable to academic and general maintenance and operation costs, the Board must maintain a minimum student fee not less than the fee charged the previous year. (2) In fixing fees applicable to dormitory rental, dining halls, laundry, infirmary, and all other personal subsistence expenses, the Board must charge students an amount sufficient to fully cover the cost of providing such facilities and services.

The tuition and fees for all undergraduate students—full or part time and auditing—are shown at right. Satisfactory settlement of all expenses is a requirement for completing each semester's class registration, and no student is officially enrolled until all past due accounts have been satisfied. Financial aid cannot be used to satisfy balances forward from a prior academic year.

In special cases the University will accept, at the beginning of a semester, a noninterest-bearing promissory note for a portion of the semester housing and semester meal plan fee. Amounts up to $450 for room rent and $450 for 5- or 7-day meal plans may be included in the note. In such cases, a note for the fall semester charges will be due October 1, and for the spring semester, March 1. Failure to pay the note when due will result in the assessment of late fees, including collection costs, denial of future deferred payment note privileges, and termination of board plan and/or cancellation of housing contract.

Currently enrolled students who expect to continue enrollment may make housing reservations by paying a $150 housing advance payment and by preregistering on-line during the spring semester at a time designated by the Housing Office.

New students who are offered on-campus housing accommodations must pay a nonrefundable $25 housing application fee and a $100 admissions deposit. The admissions deposit is deducted from the amount otherwise due for the first semester expenses. (*Note:* Policies regarding priority to/offering of on-campus housing are subject to change.)

TUITION AND FEES

Actual charges for 2001-2002 are not known when the catalog is printed. The charges reflected below are for 2000-2001 and are subject to change as conditions warrant.

	Resident Per Semester	*Nonresident Per Semester*
Full-time academic fee	$1,795.00	$4,892.00
Part-time academic fee (per semester hour)	143.00	402.00
Auditing academic fee (per semester hour)	72.00	201.00
Staff academic fee (per semester hour; first 4 hours free)	43.00	143.00
Graduate assistant academic fee	636.00	636.00
Laboratory fee (per laboratory)	25.00	25.00
Health fee (Must be paid by any student enrolled for 7 or more hours)	95.00	95.00

Residence Halls (per semester)	*Regular*	*Single*
Johnstone Hall (Section A)	885.00	
Benet, Bowen, Bradley, Cope, Donaldson, Geer, Johnstone (Annex A), Norris, Sanders, Wannamaker, Young	1,015.00	1,523.00
Barnett, Byrnes, Lever, Manning, Smith, Mauldin	1,120.00	1,680.00
Clemson House (room)	1,150.00	1,725.00
Clemson House (apartments)	1,185.00	
Thornhill Village (four occupants)	1,210.00	
Thornhill Village (two occupants)	1,815.00	
Calhoun Courts Apartments (four occupants)	1,360.00	
Lightsey Bridge Apartments	1,420.00	
Holmes and McCabe	1,290.00	
Temporary Housing	890.00	
Family Housing		*Per Month*
Townhouses		320.00
Duplex–2 Bedroom		345.00
Duplex–3 Bedroom		400.00
Faculty Houses		420.00
Faculty Houses (Renovated)		525.00
Thornhill Graduate Apartments		
9 month		375.00
12 month		345.00
Board Plans[1]		*Per Semester*
Any 10 (10 meals), Monday–Sunday		826.00
Plus Any 10 (includes $175 in bonus points)		984.00
Any 15 (15 meals), Monday–Sunday		914.00
Plus Any 15 (includes $100 in bonus points)		984.00
Five-Day (15 meals), Monday–Friday		837.00
Unlimited Access (21 meals), Monday–Sunday		984.00
Commuter 5 (lunch only), Monday–Friday		416.00
Commuter 40 (any 40 meals per semester)		221.00
Tiger Stripe account (declining balance account)		50.00

[1]All first-year freshmen who live in University housing (excluding apartments with kitchens) are required to subscribe to one of the first six board plans for their first two semesters. All other students have the option of selecting on a semester basis or paying the prevailing cash price for individual meals. The Commuter 5, Commuter 40, and Tiger Stripe account do not satisfy the freshman requirement.

TUITION AND FEES

Late Enrollment Service Charge

Registration for classes is scheduled for specific days, and definite procedures are outlined to avoid the problems incident to late registration. A student has not completed registration until all required steps have been taken. Any student failing to complete registration on the specified class registration days will incur a late enrollment charge, which begins at $25 and increases $5 each day.

Full-time Fees

Undergraduates and graduate students must be enrolled in 12 semester hours to pay full-time fees. Students enrolled in less than 12 hours or who drop below 12 hours may become ineligible for some student services, financial aid, or other programs.

Part-time Fees

Undergraduate and graduate students taking less than 12 semester credit hours will be charged each semester according to the above schedule. These fees do not provide for admission to athletic events, concert series, and other such activities.

Returned Checks

A check or charge card given in payment of University expenses or a check cashed by the University that is returned unpaid by the bank immediately creates an indebtedness to the University. University Revenue and Receivables, G-12 Sikes Hall, administers matters related to the collection of all returned checks for students and nonstudents. University Revenue and Receivables will redeposit returned checks in payment of academic fees for the fall and spring semesters. A $20 returned check charge will be assessed for each returned item in accordance with state laws. Students with returned items for payment of academic fees are also subject to a late payment fee of $5 per calendar day, not to exceed $350, beginning on the day after the last day of late registration. If the note was returned to the University in a timely manner with no response by the student or drawer, a written request to disenroll the student may be made to the Registrar. If the request is approved, the percentage of refund will be applied to the debt. If the check is returned after the mid-point of the semester with no response, a decision will be made by the Director of University Rev-

enue and Receivables and the Registrar as to the effects of disenrollment. At this point, the student will owe 100% of tuition and fees, even if he/she has been disenrolled. The University may restrict subsequent payment for academic and other fees by accepting only cash, certified checks, cashier's checks, or money orders.

Any individual who cashes a two-party check or uses a two-party check for payment of University expenses will be held responsible for that check if it is returned unpaid by the bank. Checks used as payment for various University services, such as meal plans, housing, etc., that are later returned unpaid by the bank, give the University the right to cancel such services and cause forfeiture of any refund.

Any returned check not collected by the above procedures may be turned over to a collection agency and the indebtedness reported to a credit bureau. Collection costs will be added to the debt. Transcripts and diplomas will be withheld pending payment, and the debt may be deducted from state income tax refunds.

Abuse of check cashing and check payment privileges may result in the restriction of such privileges for an indefinite period of time based on the frequency and/or dollar amount, as determined by University Revenue and Receivables.

Past Due Accounts

Any indebtedness to the University which becomes past due immediately jeopardizes the student's enrollment, and no such student will be permitted to re-enroll for an ensuing semester or summer school term. Billing fees and/or collection costs may be added to the indebtedness. Further, any student who fails to pay all indebtedness, including collection costs, to the University may not be issued a transcript or diploma. Unresolved debts may be turned over to a collection agency, reported to a credit bureau, and deducted from state income tax refunds. Debts include but are not limited to the following: parking violations, library fines, rent, academic fees, and others.

Refund of Academic Fees

(Tuition, University Fee, and Medical Fee) for Students Withdrawing, Dropping to Part Time, or Part-time Students Dropping Credit Hours

No refunds will be made on a semester's tuition and fees after four weeks from the last day to register. In the case of a withdrawal from the University, refunds will be based on the effective date of the withdrawal. In the case of a withdrawal from a course, refunds will be based on the date the student drops the course using the on-line registration system. **To be eligible for a refund, the student's request must be received by University Revenue and Receivables prior to the beginning of the next fall/spring semester or subsequent summer term.** Beginning with the day following the last day to register, refunds for periods of four weeks or less during fall/spring semester shall be made on the following basis. Students receiving Title IV Financial Aid follow a different policy. Contact University Revenue and Receivables, G-08 Sikes Hall, for details.

Fall/Spring Semester

Period of Enrollment	Percent Refund
Registration day(s) in published calendar	100%
After Late Registration: One week or less	80%
More than 1 but not more than 2 weeks	60%
More than 2 but not more than 3 weeks	40%
More than 3 but not more than 4 weeks	20%
More than 4 weeks	0%

Summer Sessions

	Length of Session — Percent Refund			
	Less Than 3 Weeks	3 Weeks	5 or 6 Weeks	More Than 6 Weeks
Registration day(s) in published calendar	100%	100%	100%	100%
After Late Registration: One week or less	0%	40%	60%	60%
More than 1 but not more than 2 weeks	0%	0%	20%	40%
More than 2 but not more than 3 weeks	0%	0%	0%	20%
More than 3 weeks	0%	0%	0%	0%

Refund of Dining Hall and Residence Hall Fees

Information relating to living-expense refunds is given in the sections on Food Service and Housing.

Refunds of Financial Aid for Students Withdrawing from the University

Refunds of academic fees are made in accordance with semester and summer session refund policies. First semester freshmen and first semester transfers receiving Title IV financial aid are under a different policy based on federal guidelines. Details are available at G-08 Sikes Hall. University housing refunds are made according to the housing contract. Meal-plan refunds are made on a pro rata basis.

Since financial aid is expected to meet or help meet educational costs, any academic fee, housing, or meal-plan fee for students withdrawing from the University up to the amount of financial aid received for that semester or summer session, will be refunded to the Financial Aid Program(s) from which the student received assistance.

To determine the amount of refund that will be returned to Federal Title IV Aid Programs and what amount will be returned to the non-Title IV Aid Programs, the following formula will be used:

$$\text{Federal Title IV Refund} = \text{Amount of Refund} \times \frac{\text{Title IV Aid Received}}{\text{Total Aid Received}}$$

$$\text{Non-Title IV Refund} = \text{Amount of Refund minus Title IV Refund}$$

In refunding monies to the various Financial Aid Programs, the following priority listings will be used:

A. Title IV Federal Programs
   1. Federal Stafford Loans (unsubsidized)
   2. Federal Stafford Loans (subsidized)
   3. Federal Plus Loans
   4. Federal Perkins Loans
   5. Federal Pell Grants
   6. Federal Supplemental Educational Opportunity Grants
   7. South Carolina State Grants
   8. Other Title IV Programs
B. Non-Title IV Programs
   1. Institutional Loans
   2. Institutional Scholarships and/or Grants
   3. Private Loans/Scholarships

After the refund has been applied to the Title IV and non-Title IV programs, any refund balance will be refunded to the student.

If debts were incurred before withdrawing, such as bad checks, unpaid traffic or library fines, etc., the refund will cover these obligations first. Academic fees, housing, and meal-plan refunds for students withdrawing will be paid to the student.

Transcripts

Official transcripts are issued only at the authorized, written request of the student. Requests are directed to the Transcript Office, 104 Sikes Hall, Box 345125, Clemson, SC 29634-5125. Payment in advance is required and can be made by Visa, MasterCard, Discover, Tiger Stripe, check (payable to Clemson University), or cash. The following must be included with the transcript request: full name (including any names used while at Clemson), social security number, current address, date of birth, date the student last attended Clemson, where the transcript is to be sent, and payment of $5 per transcript. Telephone requests will not be honored. Transcript requests are normally processed within 48 hours, but additional processing time may be required at the end of a semester. Information is available from the Student Records Office at the address above or by telephone at (864) 656-2173. Official transcripts are not issued for those who are indebted to the University.

RESIDENT TUITION AND FEES

Application for Resident Status

Any undergraduate student or prospective student whose status concerning entitlement to payment of in-state tuition and fees is uncertain has the responsibility of securing a ruling from the University by providing all relevant information on special application forms. These forms can be obtained from the Student Financial Aid Office, G-01 Sikes Hall, and are to be completed and returned to that office at least two weeks prior to registration for any semester or summer term for which the student is attempting to qualify for payment of the in-state tuition and fee rate.

Entitlement

Eligibility for payment of in-state tuition and fees shall be determined under the provisions of Sections 59-

112-10 through 59-112-100, South Carolina Code of Laws, 1976, as amended. This law is set forth in its entirety as follows (subject to further amendment by the General Assembly).

Statutes

Definitions—Section 59-112-10. As used in this chapter:

A. The words "State Institution" shall mean those post-secondary educational institutions under the jurisdiction of the following: (1) Board of Trustees, Clemson University; (2) Board of Trustees, Medical University of South Carolina; (3) Board of Trustees, South Carolina State College; (4) State College Board of Trustees; (5) Board of Visitors, The Citadel; (6) Board of Trustees, University of South Carolina; (7) Board of Trustees, Winthrop College; and (8) State Board of Technical and Comprehensive Education.

B. The word "student" shall mean any person enrolled for studies in any state institution.

C. The word "residence" or "reside" shall mean continuous and permanent physical presence within this State, provided, that temporary absences for short periods of time shall not affect the establishment of a residence.

D. The word "domicile" shall mean a person's true, fixed, principal residence and place of habitation; it shall indicate the place where such person intends to remain, and to which such person expects to return upon leaving without establishing a new domicile in another state. For purposes of this section one may have only one legal domicile; one is presumed to abandon automatically an old domicile upon establishing a new one. Housing provided on an academic session basis for students at State institutions shall be presumed not to be a place of principal residence, as residency in such housing is by nature temporary.

E. The words "in-state rates" shall mean charges for tuition and fees established by State Institutions for persons who are domiciled in South Carolina in accordance with this act; the words "out-of-state rates" shall mean charges for tuition and fees established by State Institutions for persons not domiciled in South Carolina in accordance with this act.

F. The words "independent person" shall mean a person in his majority, or an emancipated minor, whose predominant source of income is his own earnings or income from employment, investments, or payments from trusts, grants, scholarships, loans, or payments of alimony or separate maintenance made pursuant to court order.

G. The words "dependent" or "dependent person" mean: (1) one whose financial support is provided not through his own earnings or entitlements, but whose predominant source of income or support is payments from a parent, spouse, or guardian, and who qualifies as a dependent or an exemption on the federal tax return of the parent, spouse, or guardian; or (2) one for whom payments are made, under court order, for child support and the cost of his college education by an independent person meeting the provisions of Section 59-112-20 A or B. However, the words "dependent" or "dependent person" do not include a spouse or former spouse who is the recipient of alimony or separate maintenance payments made pursuant to court order.

H. The word "minor" shall mean a person who has not attained the age of eighteen years; and the words "emancipated minor" shall mean a minor whose parents have entirely surrendered the right to the care, custody and earnings of such minor and are no longer under any legal obligation to support or maintain such minor.

I. The word "parent" shall mean a person's natural or adoptive father or mother; or if one parent has custody of the child, the parent having custody; or if there is a guardian or other legal custodian of such person, then such guardian or legal custodian; provided, however, that where circumstances indicate that such guardianship or custodianship was created primarily for the purpose of conferring South Carolina domicile for tuition and fee purposes on such child or dependent person, it shall not be given such effect.

J. The word "spouse" shall mean the husband or wife of a married person.

South Carolina Domicile Defined for Purposes of Rates of Tuition and Fees—Section 59-112-20. South Carolina Domicile for tuition and fee purposes shall be established as follows in determinations of rates of tuition and fees to be paid by students entering or attending State Institutions:

A. Independent persons who reside in and have been domiciled in South Carolina for a period of no less than twelve months with an intention of making a permanent home herein, and their dependents, may be considered eligible for in-state rates.

B. Independent persons who reside in and have been domiciled in South Carolina for fewer than twelve months but who have full-time employment in the State, and their dependents, may be considered eligible for in-state rates for as long as such independent person is employed on a full-time basis in the State.

C. Where an independent person meeting the provisions of Section 59-112-20 B above, is living apart from his spouse, or where such person and his spouse are separated or divorced, the spouse and dependents of such independent person shall have domiciliary status for tuition and fee purposes only under the following circumstances: (1) if the spouse requesting domiciliary status for tuition and fee purposes remains domiciled in South Carolina although living apart or separated from his or her employed spouse, (2) if the dependent requesting domiciliary status for tuition and fee purposes is under the legal custody or guardianship, as defined in Section 59-112-10I above, of an independent person who is domiciled in this State; or if such dependent is claimed as an income tax exemption by the parent not having legal custody but paying child-support, so long as either parent remains domiciled in South Carolina.

D. The residence and domicile of a dependent minor shall be presumed to be that of the parent of such dependent minor.

Effect of Change of Residency—Section 59-112-30. When the domicile of a student or of the person upon whom a student is financially dependent changes after enrollment at a State Institution, tuition charges shall be adjusted as follows:

A. Except as provided in Section 59-112-20B above, when domicile is taken in South Carolina, a student shall not become eligible for in-state rates until the beginning of the next academic session after expiration of twelve months from date of domicile in this State.

B. When South Carolina domicile is lost, eligibility for in-state rates shall end on the last day of the academic session in which the loss occurs; however, application of this subsection shall be at the discretion of the institution involved.

C. Notwithstanding the other provisions of this section, any dependent person who has been domiciled with his family in South Carolina for a period of not less than three years immediately prior to his enrollment may enroll in a state-supported institution of higher learning at the in-state rate and may continue to be enrolled at such rate even if the parent, spouse, or guardian upon whom he is dependent moves his domicile from this State.

Effect of Marriage—Section 59-112-40. Except as provided in Section 59-112-20 above, marriage shall affect determinations of domicile for tuition and fee purposes only insofar as it operates to evince an intention by the parties to make a permanent home in South Carolina.

Military Personnel and Their Dependents—Section 59-112-50. Notwithstanding other provisions of this act, during the period of their assignment to duty in South Carolina members of the armed services of the United States stationed in South Carolina and their dependents may be considered eligible for in-state rates. When such armed service personnel are ordered away from the State, their dependents may continue for an additional twelve months to have this eligibility at the State Institutions where they are enrolled at the time such assignment ends. Such persons and their dependents may be considered eligible for in-state rates for a period of twelve months after their discharge from the armed services even though they were not enrolled at a State Institution at the time of their discharge, if they have evinced an intent to establish domicile in South Carolina and if they have resided in South Carolina for a period of at least twelve months immediately preceding their discharge.

Faculty, Administrative Employees and Dependents Thereof—Section 59-112-60. Full-time faculty and administrative employees of State Institutions, and the spouses and children of such persons, shall be excluded from the provision of this act.

Abatement of Rates for Nonresidents on Scholarship—Section 59-112-70. Notwithstanding other provisions of this act, the governing boards listed in Section 59-112-10A above, are authorized to adopt policies for the abatement of any part or all of the out-of-state rates for students who are recipients of scholarship aid.

Administration of Chapter; Burden of Proving Eligibility of Students—Section 59-112-80. Each State Institution shall designate an official to administer the provisions of this act. Students making application to pay tuition and fees at in-state rates shall have the burden of proving to the satisfaction of the aforesaid officials of State Institutions that they have fulfilled the requirements of this act before they shall be permitted to pay tuition and fees at such rate.

Penalties for Willful Misrepresentation—Section 59-112-90. Where it appears to the satisfaction of officials charged with administration of these provisions that a person has gained domiciliary status improperly by making or presenting willful misrepresentations of fact, such persons should be charged

tuition and fees past due and unpaid at the out-of-state rate, plus interest at a rate of eight percent per annum, plus a penalty amounting to twenty-five percent of the out-of-state rate for one semester; and until these charges have been paid no such student shall be allowed to receive transcripts or graduate from any State Institution.

Regulations—Section 59-112-100. The Commission on Higher Education may prescribe uniform regulations for application of the provisions of this act and may provide for annual review of such regulations.

Regulatory Guidelines

Commission on Higher Education, Chapter 62. Statutory Authority: 1976 Code Sections 59-112-10 to 59-112-100, Determination of Rates for Tuition and Fees.

Rates of Tuition and Fees—Section 62-600.

A. Resident classification is an essential part of fee determination, admission regulations, and other revelant policies of State Institutions. It is important that such institutions have fair and equitable regulations which can be administered consistently and are sensitive to the interests of both students and the State. The Commission on Higher Education hereby establishes regulations for the Statute Governing Residency and Tuition for Fee Purposes to be applied consistently by all South Carolina institutions of higher education. These regulations do not address residency matters relating to either in-county or international categories used within the State's technical colleges.

B. Institutions of higher education are required by the Statute to determine the residence classification of applicants. The initial determination of one's resident status is made at the time of admission. The determination made at that time, and any determination made thereafter, prevails for each subsequent semester until the determination is successfully challenged. The burden of proof resides with the students to show evidence as deemed necessary to establish their residency status.

Code of Laws Governing Residence—Section 62-601.

A. The rules regarding the establishment of legal residence for tuition and fee purposes for institutions of higher education are governed by the South Carolina Code of Laws.

B. As prescribed by the code, residence for tuition and fee purposes can be established by (1) independent persons, (2) dependent persons, and (3) independent immigrants, or dependent immigrants

Definitions—Section 62-602.

A. A "resident student" for tuition and fee purposes is defined as an independent person who has abandoned all prior domiciles and has been domiciled in South Carolina continuously for at least twelve months immediately preceding the first day of classes of the term for which resident classification is sought and for whom there is an absence of such evidence in other states or countries, notwithstanding other provisions of the statute. In the instances of dependent students and their families who are citizens or permanent residents, the domicile of the spouse, parent, and/or guardian for at least the twelve months immediately preceding the first day of classes of the term for which resident classification is sought is considered in determining residency status.

B. "Reside" is defined as continuous and permanent physical presence within the State, provided that temporary absences for short periods of time shall not affect the establishment of residence. Temporary absences shall be absences which are thirty days or less. Excluded are absences associated with requirements to complete a degree, absences for military training service, and like absences, provided South Carolina domicile is maintained. Absences of more than thirty days may affect the establishment or maintenance of residence for tuition and fee purposes. In the instance of dependents, except for nonresident aliens, where the spouse, parent and/or guardian "reside" will be considered in determining residency status.

C. "Domicile" is defined as true, fixed, principal residence and place of habitation, indicating where a person intends to remain, or to where one expects to return when away. Generally, an applicant must be domiciled in the State for twelve months for residency consideration.

D. "Independent Person" is defined as one in his/her majority (eighteen years of age or older), whose predominant source of income is his/her own earnings or income from employment, investments, or payments from trusts, grants, scholarships, loans, or payments made in accordance with court order. An independent person must provide more than half of his/her support during the twelve months immediately prior to the date that classes begin for the semester for which resident status is requested and cannot be claimed as a dependent or exemption on the federal tax return of his/her parent, spouse, or guardian for the year in which resident status is requested.

E. "Dependent Person" is defined as one whose predominant source of income or support is from payments from a parent, spouse, or guardian and who qualifies for and is claimed as a dependent or exemption on the federal income tax return of the parent, spouse, or guardian. A dependent person is also one for whom payments are made, under court order, for child support and the cost of the dependent person's college education.

F. "Terminal Leave" is defined as a transition period following active employment and immediately preceding retirement (with a pension or annuity), during which the individual may use accumulated leave.

G. "Immediately Prior" is defined as a period of time not exceeding ninety days and immediately preceding the first day of classes for the term in question.

H. "Continue to be Enrolled" is defined as continuous enrollment without an interruption that would require the student to pursue a formal process of readmission to that institution. Formal petitions of applications for change of degree level shall be considered readmissions.

I. "Nonresident Alien" is defined as a person who is not a citizen or permanent resident of the United States. By virtue of their nonresident status "nonresident aliens" generally do not have the capacity to establish domiciles in South Carolina.

J. "Academic Session" is defined as a term or semester of enrollment.

Citizens and Permanent Residents—Section 62-603.

A. Independent persons who have physically resided and been domiciled in South Carolina for twelve continuous months immediately preceding the date the classes begin for the semester for which resident status is claimed may qualify to pay in-state fees. The twelve-month residency period does not start until the independent person begins to take steps which indicate that the independent person intends to establish a permanent home in the State. Absences from the State for more than thirty days during the twelve-month period may affect the establishment of permanent residence for fee and tuition purposes. Steps an independent person should take to establish a permanent home in South Carolina are listed in the section entitled "Establishing the Requisite Intent to Become a South Carolina Domiciliary."

B. The resident status of a dependent person is based on the resident status of the person who provides more than half of the dependent person's support and claims the dependent person as a dependent for federal income tax purposes. The residence and domicile of a dependent minor and other dependent person shall be presumed to be that of their parent(s), spouse, or guardian(s).

C. In the case of divorced or separated parents, the resident status of the dependent person may be based on the resident status of the parent who supports and/or claims the dependent person as a dependent for tax purposes, or it may be based on the resident status of the parent who has legal custody of the dependent person.

Nonresident Aliens, Noncitizens, and Nonpermanent Residents—Section 62-604.

A. Except as otherwide specified in this section, all noncitizens and nonpermanent residents of the United States will be assessed tuition and fees at the nonresident, out-of-state rate. Independent aliens, including refugees, untainted, and parolees and their dependents, may be entitled to resident, in-state classification once they have been awarded permanent resident status by the U.S. Department of Justice and meet all the statutory residency requirements provided that all other domiciliary requirements are met. Time spent living in South Carolina immediately prior to the awarding of permanent resident status may not be counted towards the twelve month residency period. Certain nonresident aliens present in the United States in specific visa classification may be granted in-state residency for tuition and fee purposes as prescribed by the Commission on Higher Education.

B. The *Adviser's Manual of Federal Regulations Affecting Foreign Students and Scholars* will serve as the primary resource reference for defining visa categories.

Establishing the Requisite Intent to Become a South Carolina Domiciliary—Section 62-605.

A. Residence status may not be acquired by an applicant or student while residing in South Carolina for the sole purpose of enrollment in an institution or for access to state-supported programs designed to serve South Carolina residents.

B. If a person asserts that his/her domicile has been established in this State, the individual has the burden of proof. Such persons should provide to the designated residency official any and all evidence which the person believes satisfies the burden of proof. The residency official will consider any and

all evidence provided concerning such claim of domicile but will not necessarily regard any single item of evidence as conclusive evidence that domicile has been established.

C. For independent persons, examples of intent to become a South Carolina resident may include, although any single indicator may not necessarily be conclusive, indicia as listed below. The absence of indicia in other states is required before the student is eligible to pay in-state rates. Indicia may include the following:

1) statement of full-time employment;
2) possession of a valid South Carolina voter registration card and voting in South Carolina elections;
3) designating South Carolina as state of legal residence on military record;
4) possession of a valid South Carolina driver's license, or if a nondriver, a South Carolina identification card;
5) possession of a valid South Carolina vehicle registration card;
6) continuous presence in South Carolina during periods when not enrolled as a student;
7) paying South Carolina income taxes as a resident during the past tax year, including income earned outside of South Carolina from the date South Carolina domicile was claimed;
8) ownership of principal residence in South Carolina; and
9) licensing for professional practice (if applicable) in South Carolina.

D. These indicia will likewise be considered for spouses, parents, and guardians of dependent persons who wish to establish South Carolina domicile. As noted under "Citizens and Permanent Residents" above, the resident status of a dependent person matches that of the person who provides more than half of the dependent person's support and claims the dependent person as a dependent for federal income tax purposes.

Maintaining Residence—Section 62-606.

A. A person's temporary absence from the State does not necessarily constitute loss of South Carolina residence unless the person has acted inconsistently with the claim of continued South Carolina residence during the person's absence from the State. The burden is on the person to show retention of South Carolina residence during the person's absence from the State. Steps a person should take to retain South Carolina resident status for fee and tuition purposes include continuing to use a South Carolina permanent address on all records; retaining South Carolina voter's status; voting by absentee ballot; maintaining South Carolina driver's license; maintaining South Carolina vehicle registration; satisfying South Carolina resident income tax obligation. Individuals claiming permanent residence in South Carolina are liable for payment of income taxes on their total income from the date that they established South Carolina residence. This includes income earned in another state or country.

B. South Carolina residents (and their dependents) who serve in the military may continue to be eligible to pay in-state fees as long as they continuously claim South Carolina as their state of legal residence during their military service. South Carolina residents who change their state of legal residence while in the military lose their South Carolina resident status for fee and tuition purposes. To re-establish their South Carolina resident status, such persons must take steps which indicate that they plan to re-establish permanent residence in the State. These persons must then physically reside in the State for twelve continuous months.

Effect of Change of Residency—Section 62-607.

A. Notwithstanding other provisions of this section, any dependent person, except as otherwise excluded, who has been domiciled with his/her family in South Carolina for a period of not less than three years immediately prior to enrollment at state-supported colleges and universities may enroll in those institutions of higher learning at in-state rates and may continue to be enrolled at such rates even if the person upon whom he/she is dependent moves his/her domicile from this State.

B. If a dependent or independent person has been domiciled in South Carolina for less than three years, eligibility for in-state rates shall end on the last day of the academic session during which domicile is lost.

Effect of Marriage—Section 62-608.

A. In ascertaining domicile of a married person, irrespective of gender, such a review shall be determined just as for an unmarried person by reference to all relevant evidence of domiciliary intent.

B. If a nonresident marries a South Carolina resident, the nonresident does not automatically acquire South Carolina resident status. The nonresident may acquire South Carolina resident status if the South Carolina resident is an independent person and the nonresident is a dependent of the South Carolina resident.

C. Marriage to a person domiciled outside South Carolina shall not be solely the reason for precluding a person from establishing or maintaining domicile in South Carolina and subsequently becoming eligible or continuing to be eligible for residency.

D. No person shall be deemed solely by reason of marriage to a person domiciled in South Carolina to have established or maintained domicile in South Carolina and consequently to be eligible for or to retain eligibility for South Carolina residency.

Exclusions—Section 62-609.

A. Persons in the following categories may qualify to pay in-state fees without having to establish a permanent home in the State for twelve months. Persons who qualify under any of theses categories must meet the conditions of the specific category on or before the first day of classes of the term for which payment of in-state fees is requested.

1) "Military Personnel and their Dependents": Members of the United States Armed Forces (and their dependents) who are stationed in South Carolina on active duty may be considered eligible to pay in-state fees. "Armed Forces" shall mean the United States Air Force, Army, Marine Corps, and Navy. When such personnel are ordered away from the State, their dependents may continue to pay in-state fees for an additional twelve months. Such persons (and their dependents) may also be eligible to pay in-state fees for a period of twelve months after their discharge from the military, provided they have demonstrated an intent to establish a permanent home in South Carolina and they have resided in South Carolina for a period of at least twelve months immediately preceding their discharge. Military personnel who are not stationed in South Carolina and/or former military personnel who intend to establish South Carolina residency must fulfill the twelve month "physical presence" requirement for them or their dependents to qualify to pay in-state fees.

2) "Faculty and Administrative Employees, and their Dependents": Full-time faculty and administrative employees of South Carolina state-supported colleges and universities are eligible to pay in-state fees. Dependents of such persons are also eligible.

3) "Residents with Full-Time Employment and their Dependents": Persons who reside, are domiciled, and are full time employed in the State and will continue to work full time until they meet the twelve-month requirement are eligible to pay in-state fees, provided that they have taken the steps to establish a permanent home in the State (see "Establishing the Requisite Intent to Become a South Carolina Domiciliary"). The dependents of such persons are also eligible.

4) "Retired Persons": Retired persons who are receiving a pension or annuity who reside in South Carolina and have been domiciled in South Carolina as prescribed in the Statute for less than a year may be eligible for in-state rates and State-supported aid if they maintain residence and domicile in this State.

Persons on terminal leave who have established residency in South Carolina may be eligible for in-state rates even if domiciled in the State for less than one year, if they present documentary evidence for their employer showing they are on terminal leave. The evidence should show beginning and ending dates for the terminal leave period and that the person will receive a pension or annuity when he/she retires.

B. Full-time employment shall mean employment which consists of at least thirty-seven and a half hours a week on a single job in a full-time status. However, a person who works less than thirty-seven and a half hours a week but receives or is entitled to receive full-time employee benefits shall be considered to be employed full time.

C. Persons participating in Southern Regional Education Board-sponsored programs, including the Contract for Services and the Academic Common Market programs, must have continuously resided in the State for other than educational purposes for the two years immediately preceding application for consideration and must meet all residency requirements during this two-year period.

Application for Change of Resident Status—Section 62-610.

A. Persons applying for a change of resident classification must complete a residency application/petition and provide supporting documentation prior to a reclassification deadline as prescribed by the institution.

B. The burden of proof resides with those persons applying for a change of resident classification who must show required evidence to document the change in resident status.

Incorrect Classification—Section 62-611.

A. Persons incorrectly classified as residents are subject to reclassification and to payment of all nonresident fees not paid. If incorrect classification results from false or concealed facts, such persons may be charged tuition and fees past due and unpaid at the out-of-state rate. The violator may also be subject to administrative, civil, and financial penalties. Until these charges are paid, such persons will not be allowed to receive transcripts or graduate from a

South Carolina institution.

B. Residents whose resident status changes are responsible for notifying the Residency Official of such changes.

Inquiries and Appeals—Section 62-612.

A. Inquiries regarding residency requirements and determinations should be directed to the institutional residency official.

B. Each institution will develop an appeals process to accommodate persons wishing to appeal residency determinations made by the institution's residency official. Neither the primary residency official nor appellate official(s) may waive the provisions of the Statute governing residency for tuition and fee purposes.

Appeals should be sent to the Student Financial Aid Office, G-01 Sikes Hall.

FOOD SERVICE

The University provides several meal plans. Harcombe and Schilletter dining halls feature an unlimited seconds policy on most entrees, while Clemson House dining room, Canteen, and Fernow Street Cafe serve meals on an a la carte basis. Students dining at the Clemson House may use the meal card as a cash equivalency or for a predesignated meal at no additional cost. Meals may also be purchased on a cash basis or with the Tiger Stripe account.

The "branding" concept in dining facilities is available on the Clemson campus. Li'l Dino Subs and Taco Bell Express are located at the East Campus Convenience Store; Chick-fil-A is located at the Union Canteen; and the Pizza Hut Express is at the Fernow Street Cafe. All of these dining facilities accept the Tiger Stripe account and cash.

Students may choose one of several meal plans outlined in the Clemson Dining Service brochure. Meal plans begin immediately after a student obtains a meal plan at the beginning of the semester and end after the evening meal on the day of graduation at the end of each semester.

All first-year freshmen who live in University housing, excluding Calhoun Courts, Clemson House Apartments, Thornhill Village, and Lightsey Bridge Apartments, are required to subscribe to one of the following meal plans: Any Ten, Plus Any 10, Any 15, Plus Any 15, Five-Day, or Unlimited Access for their first two semesters. All other students may choose a meal plan on a semester basis or pay for individual meals. First-year freshmen living in University housing (excluding the aforementioned housing) may terminate this agreement for one of the following reasons:

- withdrawal from the University.
- change in housing assignment to an apartment with kitchen facilities.
- medical condition with dietary requirements that cannot be met by Dining Services. Documentation from a medical doctor must be provided along with specific dietary requirements. This documentation will be reviewed by the Dining Services Food Service Administrator.
- other circumstances determined by the University to be beyond the student's control.

Students must provide the necessary documentation for any of the above reasons before cancellation of this contract will be considered. Upperclassmen may terminate their meal plans for any reason. Failure to participate in a meal plan does not automatically release a student from the freshman requirement.

Students may change meal plans at the billing of spring semester fees with no service charge. Students may change meal plans after the first two weeks and prior to the last six weeks of the semester by paying a $25 service charge. Changes may be made at the Tiger 1 Card Office next door to Harcombe Dining Hall on Mondays only. All adjustments will be prorated, except for students withdrawing from the University. Students may upgrade during the registration period.

Contracts canceled for any reason after service of the first meal will result in a refund of advance payment minus a $50 termination charge and a weekly charge for meals available. The meals available charge applies to the meals that have been served, not those that have been eaten by the individual student. No refunds will be made the last six weeks of any semester. Requests for refunds may be made at the Tiger 1 Card Office.

TIGER STRIPE ACCOUNT

Under the Tiger Stripe account program, monies are deposited into an account prior to usage. The Tiger Stripe account is equivalent to a prepaid credit card. As meals or other items are purchased from dining facilities, post office, CATS, bookstore, telecommunications, Redfern Health Center, East Campus Store, Agricultural Products Sales Center, Union Copy Center, Edgar's Game Room, vending machines, or laundry, the amount spent is deducted from the Tiger Stripe account balance. All students are eligible. (First-year freshmen may participate in the Tiger Stripe account program in addition to the required meal contract.) There is a $50 minimum deposit required to open a Tiger Stripe account.

Additions to the Tiger Stripe account after registration must be made in amounts of at least $5. Tiger Stripe accounts are not refundable except for students withdrawing, graduating, or not returning. Credit balances at the end of each semester will carry forward to the next term. Students withdrawing during the semester must submit written requests for refunds in an amount greater that $5. Requests will be accepted at the Tiger 1 Card Office not later than 30 days after the end of the term for those students graduating or not returning. After this time any refunds will be forfeited. Any indebtedness to the University will be deducted from refunds.

FINANCIAL AID

The Office of Student Financial Aid administers and coordinates various types of undergraduate financial aid administered by Clemson University: scholarships, loans, grants, and part-time employment. The office works jointly with the Financial Aid and Placement Committee and the University Scholarships and Awards Committee.

Students may apply after January 1 for financial assistance for the next academic year. Financial aid requests, based on financial need, must be supported by a processed Free Application for Federal Student Aid (FAFSA) and renewed annually. No application is required for the LIFE Scholarship.

The FAFSA must be submitted by February 1 for need-based scholarship consideration and by April 1 for the federally funded Federal Supplemental Educational Opportunity Grant (FSEOG), Federal Work-Study, Federal Perkins Loan, and South Carolina State Need-Based Grant. April 1 is the suggested deadline for application for the Federal Pell Grant and Federal Stafford Loan.

Transfer students applying for student loans will be considered as entering freshmen in determining maximum loan limits. Following enrollment, after the credit evaluation process has been completed, students may submit a request for additional funds due to changes in class standing.

Brochures detailing financial aid programs at Clemson University are available from the Student Financial Aid Office, G-01 Sikes Hall, Box 345123, Clemson, SC 29634-5123.

Satisfactory Academic Progress for Financial Aid Eligibility

Students must maintain satisfactory academic progress to be eligible for financial aid. This policy contains both qualitative (grade-point ratio) and quantitative (credit hours completed) requirements. Students must meet the grade-point ratio requirement as stated under the Continuing Enrollment Policy. Students must also complete 12, 9, or 6 hours per semester according to their enrollment (full time, ¾ time, or ½ time) as of the last day to add a course. Students have a maximum of 12 full-time semesters in which to finish their degree, or the equivalent in part-time enrollment. Duplicate credits taken at Clemson University do not count as credits completed for satisfactory academic progress. Details are available in the publication *Financing Your Clemson University Education*. Students wishing to appeal their academic progress status may submit a letter to Student Financial Aid. This appeals process is separate from the Appeals Committee on Continuing Enrollment. Students returning under the academic renewal policy who apply for financial aid should also submit a letter to Student Financial Aid to update their academic progress record.

Educational Benefits for Veterans, War Orphans, and Children of Deceased or Disabled Law Enforcement Officers or Fire Fighters

The Veterans Administration provides educational assistance for veterans and children of deceased or totally disabled veterans who meet requirements of applicable laws and regulations. Any veteran or child of a deceased or totally disabled veteran should communicate with the nearest Veterans Administration Office to determine whether or not he/she is entitled to any educational benefits. Free tuition is available to children of South Carolina law enforcement officers or fire fighters who were totally disabled or killed in the line of duty. Certification is required from the agency of the parent's employment. Upon presentation of proof of eligibility, a student shall not become eligible for educational assistance until the beginning of the academic term.

STUDENT SERVICES

HOUSING

Single Student Housing

University housing provides a "home away from home" for approximately 6,500 single students in 20 residence halls, three apartment complexes, and the Clemson House. Most rooms are double occupancy with a limited number of single rooms available. The two-bedroom apartments each accommodate four students. All University housing is equipped to meet the needs of today's college student. Approximately four weeks after admissions application and fee are received, housing information will be mailed to students. A signed housing contract, room preference card, and a $25 nonrefundable application fee should be returned to the Housing Office to reserve a space. Transfer students and former students returning are offered on-campus housing only if space is available.

Graduate Student Housing

Apartment-style housing, designed for the specific needs of graduate students, is available on a 9- or 12-month lease. Apartments are double occupancy, allowing space for privacy in an area conducive to studying. Graduate students interested in on-campus housing should contact the Graduate Housing Office, 202 Mell Hall, Box 344075, Clemson, SC 29634-4075. Refunds are made according to the Housing contract.

Family/Faculty Housing

Clemson provides comfortable and economical housing with 96 apartments, conveniently located on campus, for married and single-parent students. Brochures and application forms are available from the Family Housing Office, 202 Mell Hall, Clemson University, Box 344075, Clemson, SC 29634-4075.

REDFERN HEALTH CENTER

Medical Services

Redfern Health Center, an outpatient facility, operates Monday–Friday, 7:30 A.M.–5:00 P.M. (summer hours 8:00 A.M.–4:30 P.M.). Students are seen on an appointment basis or, without appointments, in the Nurses Clinic. ASK-A-NURSE telephone services are also available. The student health center offers outpatient ambulatory care for illnesses and injury, pharmacy, lab, x-ray, and specialty clinics including orthopedics and women's health.

A completed medical clearance form is required of all students entering the University for the first time. Documentation of two red measles (rubeola) vaccines since the student's first birthday is required. Students born prior to January 1, 1957, are exempt from the measles requirements. A tuberculin skin test (PPD) is required within the past year. Students with a history of a positive skin test are required to have a chest x-ray within the past year. Students not in compliance with immunization requirements will not be allowed to complete registration for the next semester.

For more information, visit the Redfern Health Center Web site at hubcap.clemson.edu/rhc.

After Hours

Students may call ASK-A-NURSE Sunday–Thursday, 4:00–8:00 P.M. A registered nurse is available to answer questions, provide health information, and schedule appointments.

Students requiring the care of a physician after hours choose from area emergency rooms and urgent care facilities including Clemson Health Center, Oconee Memorial Hospital, Anderson Area Medical Center, Baptist Medical Center, and Greenville Memorial Medical Center. Medical costs incurred are the student's responsibility. Students should contact Redfern the next business day for follow-up care.

On-campus medical emergencies are transported by University ambulance to the closest community medical resource. The University ambulance is staffed with licensed emergency medical personnel 24 hours a day. Students are required to pay for off-campus ambulance transportation except for those medical resources within the city of Clemson for after-hours urgent care.

Counseling and Psychological Services (CAPS)

CAPS provides mental health services for a variety of issues including stress management, depression, anxiety, eating disorders, substance abuse and addictions, relationship violence, as well as others. All services are confidential. Services and charges not covered by the health fee are discussed with students and/or spouses before services are provided. Regular appointments are made by calling the Redfern appointment line (656-1541).

CAPS offers a walk-in clinic from 10:00 A.M. to 3:00 P.M so that students and/or their spouses can see a counselor as soon as possible. Students are seen on a first-come, first-served basis.

CAPS provides group, individual, and couples counseling and pychotherapy to students and their spouses. Students who pay the health fee are allowed ten counseling sessions per semester at no charge. Mental health crisis assistance and consultation are available 24 hours a day, seven days a week. Call 656-1541 during regular hours. After hours and on weekends, the on-call counselor can be reached by calling the University police at 656-2222.

CAPS Lifestyle Substance Use Services are designed to address the special needs of students and to offer early intervention before alcohol or substance abuse becomes a life-long problem. For more information, call 656-2451.

Thorough psycho-education evaluations for learning and attention difficulties are also available through CAPS.

Health Education/ Alcohol and Drug Education

Health Education strives to create a wholesome environment offering opportunities for the campus community to develop positive health behaviors. Students are encouraged to achieve optimal health by sharing knowledge, enhancing skills, and accepting responsibilities. Health Education's goal is to help educate and train students to become leaders and role models on campus. Health Education facilitates an exchange of knowledge, encourages students to adopt healthy lifestyles, modifies negative and/or risky behavior patterns, and cultivates positive attitudes. Health Education includes the Peer Health Education Program, Campus Awareness Programming, Drug and Alcohol programs, and HIV/AIDS counseling.

Financial Considerations

Health Fee. University policy requires that all students registered for seven or more credit hours during the fall or spring semester or four or more credit hours during a summer session pay the University health fee. The health fee provides access to the professional services of University physicians, nurse practitioners, counselors, and health educators at no additional cost; reduced costs for medical diagnostics; and an after-hours urgent care insurance benefit. Students pay for pharmaceuticals, diagnostic orthopedic equipment, specialty clinics, and psychological testing. Payment is expected at the time of service. Students may pay in cash, check, Visa, MasterCard, or Tiger Stripe.

Health Insurance. The University offers an accident and sickness insurance plan to help cover major medical expenses. Information is sent to all students prior to the fall semester. Students are strongly encouraged to have comprehensive health insurance coverage during their tenure at the University.

CAREER SERVICES

Clemson's Michelin® Career Center offers a range of services. The Career Center staff provides assistance in choosing a major; exploring careers; seeking internships; networking for part-time, summer, or permanent jobs; and applying to graduate and professional schools. Assistance is also available in writing résumés and preparing for interviews.

The Career Center features a large career library with information on the job outlook and salaries for hundreds of careers. A great deal of information on employers, internships, graduate/professional schools, and career planning, as well as listings of part-time jobs, is available.

Career interest testing and computerized career assistance are available. In addition to providing on-campus interviewing, the Center also refers students' résumés to employers and provides access to a database of employers.

The Career Center sponsors several major events each year. These include a campus-wide expo, an internship fair, a graduate and professional school day, and a job fair for prospective teachers.

DISABILITY SERVICES

Student Disability Services coordinates the provision of reasonable accommodations for students with physical, emotional, or learning disabilities. Accommodations are individualized, flexible, and confidential based on the nature of the disability and the academic environment, in compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990.

Students are encouraged to consult with the Disability Services staff early in the semester, preferably prior to the first day of class. Current documentation of a specific disability from a licensed professional is needed. For additional information or an appointment, contact Student Disability Services, G-24 Redfern Health Center (656-6848). Details on policies and procedures are available on at www.clemson.edu/disability_services.

ACADEMIC REGULATIONS

Proper discharge of all duties is required at Clemson University, and a student's first duty is his/her scholastic work. All students should be thoroughly acquainted with these basic requirements.

CREDIT SYSTEM

The semester hour is the basis of all credits. Generally, one recitation hour or three laboratory hours a week for a semester constitute a semester hour. Thus, in ENGL 101 Composition I 3(3,0), as this subject is listed in the *Courses of Instruction* section of this catalog, the student takes three semester hours. When the course is completed satisfactorily, three credit hours are entered on the student's record. The notation "3(3,0)" means that the course carries three credits, has three clock hours of theory or recitation per week, and no laboratory hours. CH 101 General Chemistry 4(3,3), carries four semester hours, has three hours of theory, and a three-hour laboratory period.

Credit Load

Except for an entering freshman who is restricted to the curriculum requirements of his/her major, the credit load for an undergraduate must be approved by the class advisor. The class advisor will approve a credit load deemed in the best interest of the student based on such factors as course requirements, grade-point ratio, participation in other activities, and expected date of graduation.

For fall and spring semesters, the maximum number of hours in which a student may enroll is 21, and 15 hours is the maximum credit load for those on probation. Permission of the department chair in which the student is a major is required for all registration in more than 21 hours, or 15 hours for those on probation. Enrollment in summer is limited to ten credit hours each term or seven credits each term for those on probation.

Full-time Enrollment

In fall and spring semesters, enrollment in 12 or more credit hours is considered full time. Combined enrollment in 12 or more hours in Maymester and first and second summer terms is considered full time for the summer. Enrollment in fewer than 12 credit hours is part time.

Advanced Placement and Credit by Examination

In addition to earning credit by the usual method involving classroom attendance, a student may receive credit toward his/her degree by completing a course successfully by examination only. Freshmen interested in exempting some elementary courses in this manner should participate in the College Board Advanced Placement Examination program and have the results of these tests sent to Clemson.

Certain departments will also grant credit for successful completion of College-Level Examination Program (CLEP) subject examinations which are administered by the College Board.

Enrolled students may earn credit by means of a special examination without the necessity of class attendance subject to the following requirements:

1. The applicant must present evidence that he/she has received training or taken work which is approximately equivalent to that given in the course at Clemson for which an examination is requested.

2. The applicant must not have previously failed or audited the course at Clemson.

3. The applicant must apply in writing for the examination; the request must be approved by the instructor, chair of the department in which the course is taught, and the Student Records Office. Application forms are available in the Student Records Office, 104 Sikes Hall.

4. Credit (CR) will be awarded for acceptable work in lieu of letter grades in recognition of college-level achievement as determined by College Board Advanced Placement Examination, International Baccalaureate Program, College-Level Examination Program subject examination, institutional special examinations, and similar instruments.

Transfer Credit

For Clemson students, coursework completed with a grade of C or higher at other regionally accredited institutions, including correspondence courses, telecourses, and appropriate exemption credit, will be evaluated for transfer in terms of equivalent courses included in the Clemson curriculum of the student's choice. This does not guarantee that all courses taken at other institutions will be accepted for transfer. The acceptability of each course or exemption will be based on an evaluation by the faculty concerned. Coursework earned at different institutions will not be joined to equate with one Clemson course. No course taken at a nonbaccalaureate-degree granting institution may be used as an equivalent or substitute for any 300- or 400-level Clemson course.

Learning experiences including, but not limited to, military service schools, non-collegiate sponsored instruction, work related experiences, etc. will not be evaluated for transfer; however, enrolled students may request credit by examination for any nontransferable learning experience. For additional information, see *Advanced Placement and Credit by Examination* above.

Approval of each course should be obtained by the student prior to scheduling the class. By obtaining advance approval, the student is assured of receiving proper credit at Clemson upon satisfactory completion of the course. Information and forms relative to this approval may be obtained in the Student Records Office, 104 Sikes Hall.

Learning Experiences

All "for credit" learning experiences conducted with organizations other than accredited higher education institutions must be regularly supervised by appropriate members of the Clemson University faculty or staff. The student must be enrolled at the time the credit is generated, and the level of credit (grade) is the responsibility of the faculty member(s) in the discipline from which the grade comes.

External Education Experiences

In all "for credit" external educational programs which Clemson University may have with professional, vocational, technical, clinical, and foreign study, the agreements are to be agreed to through signature of the Provost and the President. In such cases, learning experiences for which credit is awarded must be under the ultimate control and supervision of Clemson University.

GRADING SYSTEM

The grading system is as follows:

A—Excellent Indicates work of a very high character, the highest grade given.

B—Good Indicates work that is definitely above average, though not of the highest quality.

C—Fair Indicates work of average or medium character.

D—Pass Indicates work below average and unsatisfactory, the lowest passing grade.

F—Failed Indicates that the student knows so little of the subject that it must be repeated in order that credit may be received.

I—Incomplete Indicates that a relatively small part of the semester's work remains undone. Grade *I* is not given a student who made a grade *F* on his/her daily work. Students are allowed thirty days after the beginning of the next scheduled session, excluding summers and regardless of the student's enrollment status, to remove the incomplete grade. Normally, only one extension for each *I* may be granted, and this under unusual circumstances. The extension must be approved in writing by the instructor of the course and the chair of the department in which the course was taken. The extension will indicate the nature and amount of work to be completed and the time limit. (Students under this policy are prohibited from removing the *I* by repeating the course.) A letter grade of *I* converts to *F* unless the incomplete is removed within the time specified.

W—Withdrew Indicates that the student withdrew from the course or was withdrawn by the instructor after the first two weeks of classwork and prior to the last seven weeks of classes, not including the examination period. Proportionate time periods apply during summer and other shortened sessions. Each undergraduate student is allowed to withdraw or be withdrawn with a grade of *W* from no more than 17 hours of coursework during the entire academic career at Clemson University. Transfer students may withdraw from no more than 12 percent of the total work remaining to be done in the chosen undergraduate curriculum at the time of transfer to Clemson University up to a total of 17 hours of coursework, whichever is fewer. Partial credit for courses cannot be dropped. A student who exceeds these limits of hours or who is enrolled during any part of the last seven weeks of classes shall have final grades recorded. A student may withdraw from the University subject to the restrictions above. Additionally, pending approval from the provost or the provost's designee, students may withdraw from Clemson University one time only during their academic careers prior to the final seven weeks of classes (proportionate time periods apply during summer and other shortened sessions), without re-

duction from their allotted *W* hours. Any variance from these restrictions must be approved by the provost or the provost's designee and must be requested within 90 calendar days (exclusive of summer vacation) from the date printed on the grade report. The student must document the circumstances supporting the request. For financial aid purposes, enrollment is defined and satisfactory academic progress levels are established as of the last day to register or add classes. Withdrawal can negatively impact financial aid eligibility if a student does not complete a sufficient number of hours. Details are available in the publication *Financing Your Clemson University Education*.

Grade-Point Ratio

In calculating a student's grade-point ratio, the total number of grade points accumulated by the student is divided by the total number of credit hours attempted at Clemson during the semester, session, or other period for which the grade-point ratio is calculated. For each credit hour, the student receives grade points as follows: A–4, B–3, C–2, D–1. No grade points are assigned for grades *F*, *I*, *P*, or *W*.

Pass/Fail Option

Juniors or Seniors enrolled in four-year curricula may take four courses (maximum of 15 credit hours), with not more than two courses in a given semester on a Pass/Fail basis. Transfer and five-year program students may take Pass/Fail courses on a pro rata basis. Only courses to be used as electives may be taken optionally as Pass/Fail.

Letter-graded courses which have been failed may not be repeated Pass/Fail.

Registration in Pass/Fail courses will be handled in the same manner as for regular enrollment. Departmental approval must be obtained via approval form and returned to the Registrar's Office in accordance with the University calendar for adding courses. Instructors will submit letter grades to the Registration Services Office. These grades will be converted as follows: *A*, *B*, *C* to *P* (pass); *D*, *F* to *F* (fail). Only *P* (minimum letter grade of C) or *F* will be shown on a student's permanent record and will not affect the grade-point ratio.

If a student changes to a major which requires a previously passed course, and this course has been taken Pass/Fail, he/she may request either to take the course on a letter-graded basis, the *P* be changed to C, or substitution of another course.

In the event limited enrollment in a class is necessary, priority will be given as follows: majors, letter-graded students, Pass/Fail students, and auditors.

Mid-term Grades

Once, near mid-term, but no later than two days before the last day students can drop courses without receiving a final grade, instructors of every undergraduate course shall make available for each student (a) that student's ranking to-date in that course or (b) that student's course grade to-date, relative to the grading system stated in the course syllabus. More frequent feedback is strongly encouraged.

Both student and instructor are to recognize that this feedback reflects the student's performance up to that point in time, and as such, that student's final course grade may change based upon subsequent coursework performance(s).

The policy includes all undergraduate courses and applies to all summer sessions, including Maymester.

Final Examinations

The standing of a student in his/her work at the end of a semester is based upon daily classwork, tests or other work, and the final examinations. Faculty members may excuse from the final examinations all students having the grade of *A* on the coursework prior to the final examination. For all other students, written examinations are required in all subjects at the end of each semester, except in certain laboratory or practical courses in which final examinations are not deemed necessary by the department faculty.

Final examinations must be given on the dates and at the times designated in the final examination schedule.

Grade Reports

Final grade reports are mailed to enrolled students at the end of each semester, or summer session if appropriate, at their home addresses.

Dropping Classwork

A subject dropped after the first two weeks of classwork and prior to the last seven weeks during the fall and spring semesters is recorded as *W*—Withdrew. Proportionate time periods apply during summer sessions.

Continuing Enrollment Policy

At the end of any enrollment period, a notice of academic probation shall be placed on the grade report of an undergraduate student if his/her cumulative grade-point ratio is below 2.0, which is the minimum necessary for graduation.

In the event that a student is placed on academic probation, notification to that effect will be placed on the grade report for that session in which the student's academic deficiency occurred and for each session the student remains on probation. The student who clears probation by returning to the graduating academic requirement (2.0) will have notice to that effect placed on the grade report for that session. No notation concerning probation is placed on the student's permanent record.

A student on academic probation will be suspended or dismissed at the end of the spring semester if his/her cumulative grade-point ratio is below the minimum cumulative grade-point ratio (MCGPR). Students entering Clemson University for the first time will not be subject to suspension until they have attempted coursework at Clemson for two semesters, that is, fall and spring semesters (not necessarily consecutive enrollment). The minimum cumulative grade-point ratio is 2.0 for students with credit levels greater than or equal to 95 hours. For students with credit levels less than 95 hours, the MCGPR is given in the table below. CL in the table is the student's credit level, based on all credits taken at Clemson, plus any advanced standing received from transfer credits and credits based on approved examination programs.

A student who passes at least 12 semester credit hours and earns a 2.2 semester grade-point ratio on all hours attempted in the most recent semester (fall or spring) or summer session(s) is permitted to continue enrollment even though his/her cumulative grade-point ratio is below the required minimum grade-point ratio, defined above.

A student's first failure to qualify for continued enrollment will subject him/her to suspension from the University for the next fall or spring semester. Notice of academic suspension will appear on the permanent record.

CL	MCGPR	CL	MCGPR	CL	MCGPR	CL	MCGPR
16	1.28	36	1.68	56	1.85	76	1.94
17	1.31	37	1.69	57	1.85	77	1.94
18	1.35	38	1.70	58	1.86	78	1.94
19	1.37	39	1.72	59	1.86	79	1.95
20	1.40	40	1.73	60	1.87	80	1.95
21	1.43	41	1.74	61	1.88	81	1.95
22	1.45	42	1.75	62	1.88	82	1.96
23	1.47	43	1.75	63	1.89	83	1.96
24	1.50	44	1.76	64	1.89	84	1.96
25	1.52	45	1.77	65	1.89	85	1.97
26	1.53	46	1.78	66	1.90	86	1.97
27	1.55	47	1.79	67	1.90	87	1.97
28	1.57	48	1.79	68	1.91	88	1.97
29	1.59	49	1.80	69	1.91	89	1.98
30	1.60	50	1.81	70	1.92	90	1.98
31	1.62	51	1.82	71	1.92	91	1.98
32	1.63	52	1.82	72	1.92	92	1.99
33	1.64	53	1.83	73	1.93	93	1.99
34	1.66	54	1.84	74	1.93	94	1.99
35	1.67	55	1.84	75	1.93	95+	2.00

The values in this table are based on the following formula: MCGPR = 2.25 x (CL/(CL + 12))

Upon enrolling after suspension, a subsequent failure to meet the requirements for continued enrollment before clearing probation will result in dismissal from the University, and notice of dismissal will appear on the permanent record. Dismissals are for one calendar year.

Students subject to suspension or dismissal may appeal to the Appeals Committee on Continuing Enrollment at the end of the spring semester or summer session(s). The Appeals Committee on Continuing Enrollment meets approximately one week after final exams following spring and second summer session. Appeals must be in the Office of Undergraduate Academic Services no later than three days prior to the Appeals Committee meeting. An appeal must include a letter from the student giving a complete explanation for the student's poor academic performance. To the extent possible, verifiable documentation should also be included. Students are strongly encouraged to submit a letter directly to the chairperson of the Appeals Committee on Continuing Enrollment from the pertinent department chair (or designee) or academic advisor stating support of the student for continued enrollment in that department. Appeals will be granted only in the most exceptional cases, and a student will be allowed to continue on appeal only once prior to dismissal. Students who return on a successful appeal must meet the conditions specified by the Appeals Committee on Continuing Enrollment.

Students subject to suspension or dismissal after the spring semester will be permitted to enroll in summer school and may have their regular enrollment reinstated immediately if the summer school work brings their cumulative grade-point ratio above the minimum cumulative grade-point ratio or if the student passes at least twelve semester credit hours and earns a 2.2 grade-point ratio on all hours attempted during the summer session(s).

When a student is suspended or dismissed for academic reasons, ineligibility to continue officially commences on the first day of classes of the very next semester (fall or spring, as appropriate) immediately following the decision of ineligibility.

A student who has been dismissed may file a petition for readmission with the Appeals Committee on Continuing Enrollment after one calendar year. If this petition is denied, the student may file subsequent petitions for readmission after any intervening term of enrollment. Dismissed students who are readmitted and again fail to meet the requirements for continuing enrollment will be dismissed and may not appeal to continue.

This continuing enrollment appeals process is separate from the unsatisfactory academic progress appeal with Student Financial Aid. Students subject to suspension or dismissal must be allowed to continue enrollment before submitting a satisfactory academic progress appeal for financial aid eligibility. Further information on satisfactory academic progress is available in the *Financial Information* section and in the publication *Financing Your Clemson University Education*.

Grade Protests

A student wishing to protest a final course grade must first try to resolve any disagreement with the instructor. If unable to reach a resolution, the student may follow the procedures listed under "Academic Grievance Committee." Grievances must be filed within 90 calendar days (exclusive of summer vacation) from the date printed on the grade report.

Repeating Courses Passed

A student may repeat a course passed with a grade lower than *B*. Both grades will be calculated in the grade-point ratio; however, credit for the course will be counted only once toward the number of hours required for graduation. For financial aid purposes, duplicate credits do not count as credits completed for satisfactory academic progress. If a student repeats a course passed with a grade of *B* or better, the credits attempted as well as credits and grade points earned will be removed from the cumulative summary.

Repeating Courses Failed

A student who has failed a course (made *F*) cannot receive credit for that course until it has been satisfactorily repeated hour for hour in a class; except that in the case of corelated laboratory work, the number of hours to be taken shall be determined by the instructor. Where separate grades for class and laboratory work are given, that part of the subject shall be repeated in which the failure occurs. Successfully repeating a course previously graded *F* does not erase the original *F* grade from the student's record. Both grades will appear on the record and will be computed in the grade-point ratio.

GRADUATION REQUIREMENTS

A candidate for an undergraduate degree is a student who has turned in a completed diploma application by the deadline prescribed in the University calendar for a particular graduation date.

Residence Requirement

To qualify for an undergraduate degree, a student must complete through instruction from Clemson a minimum of 37 of the last 43 credits presented for the degree. (To qualify for the five-year professional undergraduate degree in Landscape Architecture, a student must complete through instruction from Clemson, a minimum of 42 of the last 48 credits presented for the degree.)

Make-up of Incompletes Received in Last Semester

A candidate for a degree who receives one or more grades of *I* in the semester immediately prior to graduation shall have an opportunity to remove the unsatisfactory grades provided the final grades are received in the Registration Services Office, E-206 Martin Hall, by the time grades for candidates for graduation are due. A student who qualifies for graduation under this regulation will be awarded his/her degree on the regular date for the award of degrees.

Special Requirements

A cumulative grade-point ratio of 2.0 is required for graduation, and candidates for degrees must be officially accepted in the major in which they are applying for a degree in the term prior to application for the degree. Candidates for degrees are required to apply for their diplomas within three weeks following the opening of the final semester or the opening of the first summer session prior to the date the degrees are to be awarded. Applications forms are available in the Student Records Office, 104 Sikes Hall.

Credit Limitation

If all work toward a degree is not completed within six years after entrance, the student may be required to take additional courses.

Academic Honors

Honor Graduates

To be graduated with honors a student must have a minimum cumulative grade-point ratio as follows: cum laude—3.4, magna cum laude—3.7, and summa cum laude—3.9.

Honor Lists

At the end of the fall and spring semesters, the following lists shall be compiled of undergraduate students who have achieved grade-point ratios of 3.5 to 4.0 on a minimum of 12 semester hours, exclusive of Pass/Fail coursework.

Dean's List—3.5 to 3.99 grade-point ratio
President's List—4.0 grade-point ratio

Honors and Awards

The University offers a number of awards for outstanding achievement in specific fields and endeavors. Recipients are chosen by selection committees and are announced at the annual Honors and Awards Day program or other appropriate ceremonies. Detailed information relating to such awards is available in the offices of the academic deans and department chairs.

CLASSWORK

Course Prerequisites

Prerequisites for each course are enumerated under each course in the *Courses of Instruction*. In addition to these requirements, colleges and departments may also establish other standards as conditions for enrollment. It is the student's responsibility to refer to individual college and curricular information for specific standards.

Class Attendance

College work proceeds at such a pace that regular attendance is necessary for each student to obtain maximum benefits from instruction. Regular and punctual attendance at all class and laboratory sessions is a student obligation, and each student is responsible for all the work, including tests and written work, in all class and laboratory sessions. No right or privilege exists that permits a student to be absent from any given number of class or laboratory sessions except as stated in the syllabus for each course. At the same time, it is obvious that students have valid reasons for missing classes; the instructors are expected to be reasonable in the demands they place on students. In this regard, instructors must inform the students in the syllabus

required in every class what constitutes excessive absences and the penalty, if any, for such absences. Faculty who impose penalties for excessive absences must keep accurate attendance records.

Some students are on scholarships and/or grants-in-aid overseen by the University Scholarships and Awards Committee. The acceptance of such scholarships and/or grants-in-aid may require participation in events both on and off campus. Additionally, students occasionally are required to miss class because of participation in co-curricular activities, such as class trips, that the faculty members note on their syllabi. The student must discuss these activities with the faculty members whose classes will be missed well in advance of their occurrences. The documentable absences are necessary, and the instructor will make arrangements for those students to make up graded work that takes place during those necessary absences. The time, location, and nature of the make-up work will be at the discretion of the instructor. If required, documentation will be provided to instructors by students.

Instructors are expected to set reasonable policies in working with those student personal documentable absences that are truly beyond the student's control. After reviewing the reason for the absence, the instructor at his/her discretion may allow the student to make up the graded work missed.

All other aspects of class attendance are within the discretion of the instructor, department, or college responsible for the course. If a student feels unfairly treated in any attendance-related situation, the student has the right of appeal to the Academic Grievance Committee.

First Day Class Attendance

All students are required to attend the first scheduled day of classes and labs. Students who cannot attend the first class are responsible for contacting the instructor to indicate their intent to remain in that class. If a student does not attend the first class meeting or make contact with the instructor by the second meeting or the last day to add, whichever comes first, the instructor has the option of dropping that student from the roll.

Dead Days

During Dead Days, all regularly scheduled classes are conducted; however, course testing on these days is limited to scheduled laboratory and one-semester-hour course final exams and make-up tests. Dead Days are observed during fall and spring semesters only. Dead Days do not apply to courses numbered 600 or above.

Auditing Policies

Qualified students may audit courses upon the written approval of the instructor. Auditors are under no obligation of regular attendance, preparation, recitation, or examination and receive no credit. Participation in classroom discussion and laboratory exercises by auditors is at the discretion of the instructor. A student who has previously audited a course is ineligible for credit by examination.

Undergraduate and graduate students enrolled in 12 or more hours may audit courses at no additional charge. Others interested in auditing should verify their eligibility through the Registrar's Office.

Cross-Listed Courses

A cross-listed course is one that can be taken for credit under different departmental titles. For example, students can take *Demography* as either R S 471 or SOC 471. The student should select the desired departmental title in conference with an advisor. The departmental title may be changed only during the period allowed by the University calendar for adding a course.

Enrollment in Graduate Courses

Enrollment of Clemson University seniors in any graduate course is subject to approval by the department offering the course and the Graduate School. This approval is required prior to registration and may be obtained by completing and returning Form GS6 to the Graduate School Office. The total course workload for the semester must not exceed 18 hours, and the cumulative graduate credits earned by seniors shall not exceed 12 semester hours.

Seniors with a cumulative grade point ratio of 3.0 or higher may enroll in 700- or 800-level courses and may use these courses to meet requirements for the bachelor's degree. However, courses used for this purpose cannot be counted later toward an advanced degree. Alternatively, such students may take 600-, 700- or 800-level courses in excess of the requirements for their undergraduate degrees and may request that these courses be included as a part of their graduate program if they are subsequently admitted to the Graduate School. Courses cannot be taken at the 600 level if their 300- and 400-level counterparts are required for the undergraduate degree in the same academic major as the proposed graduate degree.

A Clemson senior with a cumulative grade-point ratio less than 3.0 may apply to the Graduate School for conditional acceptance. If accepted, the student may enroll in graduate courses for inclusion in a future graduate program, subject to approval of Form GS6. The form must be turned in and accepted by the Graduate School before a student can register for graduate courses.

In all cases, the credits and quality points associated with senior enrollment in graduate courses will be part of the undergraduate record.

ACADEMIC RECORDS

The student's permanent academic record is maintained in the Registrar's Office and contains personal identifying information, grades, and credits. Where appropriate, statements of a corrective nature, withdrawals, suspension for failure to meet academic standards, suspension for disciplinary reasons, and graduation data are added. It is a historical record of the student's academic progress.

Classification

All new students are classified as freshmen unless they have attended another college prior to entrance. Students who have completed college work elsewhere will be classified on the basis of semester hours accepted at Clemson rather than the amount of work presented. To be classified as a member of any class other than freshman, students must meet the credit-hour requirements below:

Sophomore—30 credit hours
Junior—60 credit hours
Senior—95 credit hours

Academic Advising

Each student is assigned an academic advisor in his/her major area. It is the responsibility of the student to consult with the advisor during registration. The advisor will assist the student in scheduling courses so as to fulfill the requirements of the degree program. Nevertheless, it is the responsibility of the student to fulfill the relevant requirements of the degree. Advisors also maintain files on individual advisees to assist in academic planning.

Change of Major

Any undergraduate student who meets the Continuing Enrollment Policy after attempting 12 credit hours at Clemson University (or who is allowed to continue by virtue of a semester 2.2 grade-point ratio on 12 earned credits or who is allowed to continue through appeal to the Continuing Enrollment Appeals Committee or by other authorization of this committee) may transfer from one major to another at will. Any college or department which seeks an exception to this policy must have the approval of the collegiate dean and the Provost.

Withdrawal from the University

A student may withdraw from the University subject to the restrictions in the section on *W—Withdrew*. Students who exceed these restrictions shall have final grades recorded. Any variance from the restrictions must be approved by the provost or the provost's designee and must be requested within 90 calendar days (exclusive of summer vacation) from the date printed on the grade report. The student must document the circumstances supporting the request. All University withdrawals (including withdrawing from the only course in which a student is enrolled) must be processed by the Associate Dean of Undergraduate Academic Services. Students should report to Room 101, Sikes Hall. For financial aid purposes, enrollment is defined and satisfactory academic progress levels are established as of the last day to register or add classes. Withdrawing from the University can negatively impact financial aid eligibility if a student has not completed a sufficient number of hours. Details are available in the publication *Financing Your Clemson University Education*.

Academic Renewal

The student who has not enrolled at Clemson for a period of two or more academic years may apply to the Appeals Committee on Continuing Enrollment for readmission under special conditions known as academic renewal. Under these conditions, the previous credits attempted and quality-point deficit will not constitute a liability in a new grade-point computation. However, no credits passed or their attending quality points will be available to the student for a degree at Clemson. The previous record will appear on the permanent record as well as the notation of readmission under the policy of academic renewal. Students returning under the academic renewal policy who apply for financial aid should submit written notification of their status to the Office of Student Financial Aid in order to update their academic progress record.

ACADEMIC INTEGRITY

As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a "high seminary of learning." Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form.

I. Academic Integrity Policy

A. Any breach of the principles outlined in the Academic Integrity Statement is considered an act of academic dishonesty.

B. Academic dishonesty is further defined as:

1. Giving, receiving, or using unauthorized aid on any academic work;

2. Plagiarism, which includes the copying of language, structure, or ideas of another and attributing the work to one's own efforts;

3. Attempts to copy, edit, or delete computer files that belong to another person or use of Computer Center account numbers that belong to another person without the permission of the file owner, account owner, or file number owner;

C. All academic work submitted for grading contains an implicit pledge and may contain, at the request of an instructor, an explicit pledge by the student that no unauthorized aid has been received.

D. It is the responsibility of every member of the Clemson University community to enforce the Academic Integrity Policy.

II. Academic Integrity Committee

The power to hear cases of academic dishonesty is vested in an Academic Integrity Committee.

A. Structure

The Academic Integrity Committee is composed of twenty members as follows:

1. Ten tenured members of the faculty; two members from each college elected by their respective collegiate faculties. Faculty members will be elected on a staggered term basis, serving for a period of two years after initiation of staggered terms. Terms commence with fall semester late registration.

2. Ten members of the undergraduate student body; two from each college. Student members are nominated by the Student Body President, through an application and interview process in the spring semester, approved by the Student Senate, and appointed by the Provost for terms of two years. Students must have a 3.0 grade-point ratio at the time of appointment and must have completed 30 hours by the end of the spring semester. Nominations will be made in the spring semester with terms of service commencing with fall semester late registration.

3. The committee is divided into four standing boards, hereafter referred to as hearing boards, which will hear the cases of academic dishonesty. Hearing boards convene on a weekly, rotational basis unless there are no cases to be heard. For summer sessions, the Associate Dean of Undergraduate Academic Services must maintain at least one hearing board to hear cases.

4. Hearing boards are comprised of two faculty members, two students, and one chairperson. Quorum, for a hearing board, is one student, one faculty member, and a chairperson. Decisions by the hearing board will be by majority vote.

5. Chairpersons will be elected from within the Committee's membership. Two chairpersons are selected from the faculty membership and two from the student membership. Chairpersons will vote only to break a tie.

6. Before hearing any cases, a new member of the committee must undergo a training session(s) with the Associate Dean of Undergraduate Academic Services.

7. The Associate Dean of Undergraduate Academic Services is the administrative coordinator of the Academic Integrity Committee.

B. Procedures

1. When, in the opinion of a faculty member, there is evidence that a student has committed an act of academic dishonesty, the faculty member shall make a formal written charge of academic dishonesty, including a description of the misconduct, to the Associate Dean of Undergraduate Academic Services. At the same time, the faculty member may, but is not required to, inform each involved student privately of the nature of the alleged charge.

2. When, in the opinion of the student, there is evidence that another student has committed an act of academic dishonesty, he/she should contact the faculty member for the course to discuss the incident. After being contacted, if, in the opinion of the faculty member, there is evidence that a student has committed an act of academic dishonesty, the faculty member shall make a formal written charge of academic dishonesty, including a description of the misconduct, to the Associate Dean of Undergraduate Academic Services. At the same time, the faculty member may, but is not required to, inform each student involved privately of the nature of the alleged charge.

3. When the Associate Dean of Undergraduate Academic Services has received a formal charge of an alleged violation, he/she will contact the student involved privately to notify him/her of the charge and at the same time will provide the student with a copy of the charge and a copy of the procedures that the Academic Integrity Committee has adopted, pursuant to number 6 below.

4. After informing the student involved, the Associate Dean of Undergraduate Academic Services will convene one of the boards of the Academic Integrity Committee within 14 calendar days of his/her being notified of an alleged violation. All students will be presumed innocent of a violation until found guilty by a hearing board.

5. A charge of academic dishonesty in a course must be made within 14 calendar days of the date printed on the grade report for the semester or session in which the course is completed. If an *I* (Incomplete) is given in a course, the grade in the course is considered to be final when the *I* is made up.

6. The Academic Integrity Committee will adopt its procedures, to be followed by all hearing boards, prior to the first case heard by a hearing board. In addition to providing the student with a copy of the procedures, as stated in number 3 above, the Associate Dean of Undergraduate Academic Services will provide a copy of the procedures to the involved faculty member and also the hearing board members. The Associate Dean of Undergraduate Academic Services will also retain copies of these procedures. The procedures must afford both faculty and students the opportunity to present their cases and the opportunity for rebuttal.

7. In cases in which there is a finding of guilt, the faculty member may consult with the Associate Dean of Undergraduate Academic Services to consider any past precedent established regarding academic penalties levied in similar cases. Faculty members must inform the Associate Dean of Undergraduate Academic Services of the academic penalty for a student found guilty by a hearing board.

8. The Associate Dean of Undergraduate Academic Services is responsible for notifying the registrar and all other appropriate University personnel of the finding of guilt and the academic penalty. The Associate Dean of Undergraduate Academic Services retains all records of academic dishonesty cases and their findings in accordance with the University's Records Retention Policy.

C. Penalties

1. Upon a finding of "not guilty" by a hearing board, the student's record will not reflect the incident.

2. Upon a finding of "guilty" by a hearing board, the Associate Dean of Undergraduate Academic Services will notify the student and faculty member of the decision immediately. If the offense is the first for the student, then the faculty member has the ability to determine the academic penalty, which shall not exceed a grade of *F* for the course.

3. If the finding of guilt is not the student's first offense, the student will receive a grade of *F* for the course, will be suspended from the University for one or more semesters, and may be permanently dismissed from the University. The hearing board will determine the period for which the student will be suspended or, if applicable, permanently dismissed. Suspension or dismissal requires the approval of the President of the University.

D. Appeals

1. Students do not have the option to appeal a decision of guilt rendered by the hearing board, whether it is the first, second, or any subsequent offense. Students do not have the option to appeal the penalty determined by the faculty member for first offenses or to appeal the grade of *F* for the course given for second offenses.

2. For offenses resulting in suspension or permanent dismissal, students have the option to present written information to the President of the University to appeal the length of the suspension or to appeal a decision of permanent dismissal. Students must present information in their defense, as allowed in this paragraph, to the President within five working days after receipt of written notification of the suspension or dismissal. However, as stated in number 1 above, students cannot appeal a decision of guilt rendered by the hearing board.

ACADEMIC GRIEVANCE COMMITTEE

I. General

The Academic Grievance Committee hears all grievances involving the following: (a)allegations by undergraduate students against a faculty or staff member of discrimination in academics on the basis of race, color, national origin, sex, age, religion, disabil-

ity, or veterans status (except in those cases where the grievance involves student employment); (b) grievances of a personal or professional nature involving an individual undergraduate student and a faculty member; and (c) claims by undergraduate students concerning the inequitability of final grades. (The only aspects of a final grade case that are grievable are claims by students of final grades being changed because of personal or professional reasons. Students may not grieve issues such as quality of instruction or the difficulty of testing, for example.) In all unresolved cases, the committee makes its recommendations to the President through the Provost. All proceedings of the committee are confidential. (For possible grievances arising from the inability to understand teachers whose first language is not English, the student must follow the English Fluency Policy referenced in the *Student Handbook* and *Schedule of Classes*.)

The Academic Grievance Committee is composed of 28 members as follows:

A. Fifteen members of the faculty; three members from each college. Members are appointed on a staggered basis by the respective college deans and serve for a period of three years. Term commences with fall semester registration.

B. Twelve undergraduate students, nominated by the student body president, approved by the Student Senate and appointed by the Provost for one-year terms. Nominations should be made in the spring semester. Term of service commences with fall semester late registration. At least one and no more than three students shall be appointed from any one college.

C. Dean of Student Life (or designee);

D. The Senior Vice Provost and Dean of Undergraduate Studies shall appoint the chairperson from those faculty members who have previously served.

II. Rules and Procedures for Academic Grievances

1. Any student filing a grievance must first attempt to resolve it by consulting with the involved faculty or staff member for resolution. In the event no resolution is reached, the student shall consult serially with the Ombudsman, who shall remain a neutral party, in the Office of Undergraduate Academic Services, the department chair and dean of the faculty member, who shall hear the grievance and act as mediators. Consultation by any party with the Ombudsman shall remain confidential. The Ombudsman, dean, department chair or immediate staff superior, faculty or staff member and student shall make every effort to reach a solution.

2. If the grievance remains unresolved, the student may bring a written statement detailing the grievance before the Academic Grievance Committee. The student must report to the Office of Undergraduate Academic Services and secure a checklist form which the student will use to document the following: (a) the dates of those consultations described in Procedure 1, above, (b) the names of those persons consulted, and (c) the signature of the collegiate dean attesting that no resolution could be reached. (Note: If all parties agree, the checklist may be signed and dated during the initial consultation.) Both the written statement and the checklist form must be delivered to the Office of Undergraduate Academic Services within 90 calendar days (exclusive of summer vacation) from the date the student alleges to have been aggrieved; or, in a case involving a protest of a final grade, the grievances must be filed within 90 calendar days (exclusive of summer vacation) from the date printed on the grade report for the term in which the student alleges that an inequitable grade was recorded. The Office of Undergraduate Academic Services will retain the original documents and forward a copy of the grievance to the chairperson of the Academic Grievance Committee. In a case involving a protest of final grade, the Office of Undergraduate Academic Services will notify the Office of Records and Registration of the filed grievance. The failure of a student to file a grievance within the 90-day period will cause him/her to forfeit his/her right to file a grievance under this procedure. (d) If a student files a grievance, the professor has 90 days (excluding summer) to respond.

3. The documents referred to in Procedure 2, shall be delivered to the chairperson of the Academic Grievance Committee. The chairperson shall, upon receipt of the documents, appoint a subcommittee consisting of a chairperson who is a faculty or staff member of the committee and at least two other committee members, including at least one student, to investigate the grievance. If possible, the subcommittee shall include members who are not in the same college as the grievant.

4. The committee members appointed by the chairperson will constitute the subcommittee to investigate the grievance. A minimum of three subcommittee members, including at least one student member, must be present for the subcommittee to conduct the hearing described in Procedure 7.

5. The subcommittee to investigate the grievance will attempt to gather all information pertinent to the grievance in separate meetings with the individuals who give information concerning the grievance; however, after the separate meetings have been held, the subcommittee may question the student and faculty or staff member simultaneously in one meeting. Such a joint meeting will be held only if the subcommittee deems it necessary for clarifying the facts.

6. The Academic Grievance Committee will, to the greatest extent possible, handle each case in a confidential manner.

7. The hearing on the grievance will be informal and shall be closed to the public. The chairperson shall take whatever action is necessary to ensure an equitable, orderly and expeditious hearing. Minutes of the meeting shall be taken, and all parties to the grievance shall be given an opportunity to be heard. Each party is responsible for having present at the hearing all witnesses that he/she wishes to speak on his/her behalf. In addition, the chairperson may request the presence of any other person who can supply information pertinent to the grievance. Witnesses shall not be present during the hearing proceedings except when they are called to speak before the committee. The parties shall be permitted to question all individuals who are heard by the committee. If any witness is unable to be present at the hearing, the chairperson may, at his/her discretion, accept a written statement from that witness to be presented at the hearing. The parties shall be accorded the right to assistance of counsel of their own choice; however, counsel shall not be permitted to participate actively in the proceedings.

8. Upon conclusion of the hearing, the subcommittee shall reach, by majority vote, a posed solution to the grievance. The subcommittee chairperson shall then formulate the findings in writing and seek to obtain from the parties involved in the grievance signed acceptance for a recommended solution to the grievance. If all parties to the grievance accept the solution posed by the subcommittee, the matter of the grievance will be considered closed when the solution has been implemented. Copies of the written findings and recommended solution will be forwarded by the subcommittee chairperson to all parties to the grievance for acceptance via return receipted certified mail. Each party will be asked to indicate acceptance of the posed solution by signing and returning the letter within 14 calendar days of its date. Failure to respond within 14 calendar days will constitute acceptance. Proper notification of the solution arrived at by the Academic Grievance Committee will then be mailed by the subcommittee chairperson to the involved faculty or staff member, department chair of the faculty member or immediate superior of staff member, the involved collegiate dean, and Associate Dean of Undergraduate Academic Services. In a case involving a protest of a final grade, the subcommittee chairperson will also notify the Office of Records and Registration of the solution arrived at by the Academic Grievance Committee.

9. If, after the conclusion of the hearing on the grievance, the chairperson cannot secure acceptance of the posed solution, the grievance shall be referred to the President of the University via the Provost with the committee's recommended solution to the grievance along with all supporting evidence previously submitted to the Academic Grievance Committee. When grievances are referred in this manner, the President, on behalf of the University, shall make the final decision on the solution to the grievance and will then notify the involved faculty or staff member, department chair of the involved faculty member or immediate superior of the staff member, involved collegiate dean, and Associate Dean of Undergraduate Academic Services of the University's final decision. In a case involving a protest of a final grade, the President will also notify the Office of Records and Registration of the University's final decision.

10. The chairperson shall keep in confidence all records pertinent to each grievance and pass these records to the Office of the Provost for filing. Records shall be available to succeeding chairpersons of the Academic Grievance Committee.

11. The Academic Grievance Committee shall make every reasonable effort to resolve every grievance presented to it by the end of the semester in which each grievance is received.

12. These procedures can be changed by the Academic Council. Such changes shall not affect any case under consideration at the time of the change. Notification of any changes to the procedure shall be given to the President of the University via the Academic Council.

GENERAL EDUCATION

An undergraduate student whose enrollment in a curriculum occurs after May 15, 1996, must fulfill the general education requirements in the catalog in effect at the time. A student who withdraws from the University and subsequently returns after May 15, 1996, will be required to satisfy the general education requirements. Any variation in curricular or general education requirements shall be considered under the substitution procedure.

MISSION STATEMENT

Academic institutions exist for the transmission of knowledge, the pursuit of truth, the intellectual and ethical development of students, and the general well-being of society. Undergraduate students must be broadly educated and technically skilled to be informed and productive citizens. As citizens, they need to be able to think critically about significant issues. Students also need to be prepared to complete undergraduate work and a major course of study. The mission requires a high level of knowledge about and competence in the following areas: communication, computer use, mathematics, problem solving, natural sciences, social sciences, humanities, and arts. Thus the mission of general education is to provide Clemson undergraduate students with a structured base through which these needs can be met.

COURSE REQUIREMENTS

General education requirements in some curricula are more restrictive than those shown below.

Courses approved for Oral Communication, Writing Intensive, or Computer Skills credit are indicated in the *Courses of Instruction* in brackets (e.g. ENGL 314 3(3,0) [W.3]).

A. Communication and Speaking Skills ..... 12 hours

1. **ENGL 101** and **ENGL 102** ..... **6 hours**

2. **Oral Communication** ..... **3 hours**
   - ARCH 151 ..... O.1
   - ARCH 152 ..... O.1
   - ARCH 251 ..... O.1
   - C E 350 ..... O.1
   - C E 351 ..... O.1
   - C E 459 ..... O.1
   - C M E 242 ..... O.1
   - C M E 341 ..... O.1
   - C M E 407 ..... O.1
   - CH E 307 ..... O.1
   - CH E 407 ..... O.1
   - CH E 432 ..... O.1
   - CH E 444 ..... O.1
   - E C E 320 ..... O.1
   - E C E 495 ..... O.1
   - E C E 496 ..... O.1
   - ENT 305 ..... O.2
   - ENT 462 ..... O.1
   - M E 401 ..... O.1
   - M E 402 ..... O.2
   - SPCH 150 ..... O.3
   - SPCH 250 ..... O.3
   - SPCH 251 ..... O.3

3. **Writing Intensive** ..... **3 hours**
   - ARCH 351 ..... W.1
   - ARCH 352 ..... W.1
   - ARCH 451 ..... W.1
   - B E 322 ..... W.1
   - B E 471 ..... W.1
   - C M E 342 ..... W.1
   - C M E 407 ..... W.1
   - C M E 441 ..... W.1
   - C R P 483 ..... W.2
   - CH E 307 ..... W.1
   - CH E 407 ..... W.1
   - CH E 432 ..... W.1
   - E C E 311 ..... W.1
   - E C E 312 ..... W.1
   - E C E 371 ..... W.1
   - E C E 417 ..... W.1
   - ECON 424 ..... W.2
   - ED 488 ..... W.1
   - ED F 458 ..... W.1
   - ED SP 495 ..... W.3
   - ENGL 304 ..... W.3
   - ENGL 312 ..... W.3
   - ENGL 314 ..... W.3
   - ENGL 316 ..... W.3
   - ENGL 333 ..... W.3
   - ENGL 334 ..... W.3
   - ENGL 345 ..... W.3
   - ENGL 346 ..... W.3
   - ENGL 386 ..... W.1
   - HIST 314 ..... W.1
   - HIST 318 ..... W.2
   - HIST 323 ..... W.1
   - HIST 361 ..... W.2
   - HIST 365 ..... W.2
   - HIST 373 ..... W.2
   - HIST 387 ..... W.2
   - M E 401 ..... W.2
   - M E 402 ..... W.1
   - MTHSC 302 ..... W.1
   - NURS 320 ..... W.1
   - NURS 330 ..... W.1
   - NURS 405 ..... W.1
   - NURS 406 ..... W.1
   - READ 459 ..... W.1

B. Computer Skills ..... 3 hours

- AGRIC 200 ..... C.3
- ARCH 151 ..... C.1
- ARCH 251 ..... C.1
- ARCH 252 ..... C.1
- B E 450 ..... C.1
- C E 251 ..... C.1
- C M E 304 ..... C.1
- C M E 407 ..... C.1
- CH E 413 ..... C.1
- CP SC 101 ..... C.3
- CP SC 110 ..... C.3
- CP SC 111 ..... C.3
- CP SC 120 ..... C.3
- CP SC 210 ..... C.3
- CP SC 211 ..... C.1
- E G 209 ..... C.1
- ED F (AG ED, THRD) 480 ..... C.3
- ENGR 120 ..... C.1
- I E 320 ..... C.2
- M E 205 ..... C.1
- NURS 140 ..... C.3
- PRTM (FOR) 209 ..... C.3

C. Mathematical Sciences .... 6 hours

- EX ST 301
- MTHSC 101, 102, 106, 108, 115*, 116*, 203, 207, 301

*MTHSC 115 and 116 may be used by students graduating in Early Childhood, Elementary, and Special Education only.

D. Physical or Biological Science ..... 8 hours

A two semester sequence in the same physical or biological science, each including a laboratory

- ASTR 101/103, 102/104
- BIOL 101, 102, 103, 104, 110, 111
- CH 101, 102, 105, 106
- GEOL 101/103, 102, 112/114
- PH SC 107, 108
- PHYS 122/124 , 207, 208, 221/223, 222/224

E. Humanities ..... 6 hours

1. Three hours selected from sophomore literature courses (200 level only) or foreign language literature (300 level or higher)
   - ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210
   - FR 300, 400, 406, 407, 408, 499
   - GER 301, 302, 401, 402, 403
   - ITAL 301, 302, 400
   - JAPN 406
   - SPAN 301, 303, 311, 401, 403, 404, 405, 406, 422, 499
2. Three hours selected from the following:
   - A A H 101, 210
   - C H S H203
   - ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210, 350, 351, 353, 355, 356, 357, 380, 385, 386
   - FR 201, 202
   - GER 201, 202
   - G W 301
   - HUM 301, 302, 306, 309
   - ITAL 201, 202
   - JAPN 201, 202
   - MUSIC 210, 311, 312, 313, 314
   - PHIL 101, 102, 103, 303, 304, 315, 316, 317, 318, 320, 323, 324, 325, 326, 327, 330, 343, 344, 345
   - REL 101, 102, 301, 306, 307
   - RUSS 201, 202
   - SPAN 201, 202, 221
   - SPCH 365, 369
   - THEA 210, 315, 316, 317
   - W S 301

F. Social Science ..... 6 hours

- A A S 301
- AGRIC 105
- ANTH 201, 301, 320
- AP EC 202, 302, 309, 319, 490
- AVS 315
- C H S H201, H202
- C R D 357, (AP EC, HLTH) 361
- ECON 200, 201, 211, 212, 301, 302, (MGT) 306, 307, 308, 309, 310, 314, 315, 324, 404
- GEOG 101, 103, 301, 302, 303, 305, 306, 330, 340
- HIST 101, 102, 122, 172, 173, 300, 301, 302, 303, 304, 305, 307, 311, 312, 313, 314, 316, 318, 321, 322, 323, 325, 327, 328, 329, 330, 333, 338, 339, 340, 341, 342, 351, 354, 355, 361, 363, 365, 370, 372, 373, 374, 375, 377, 378, 380, 381, 384, 385, 386, 387, 390, 391, (F&RR) 392, 393
- PO SC 101, 102, 302, 361, 381, 480
- PRTM 201, 301
- PSYCH 201, 306, 308, 320, 324, 330, 333, 340, 344, 345, 352, 355, 364, 368, 370, 375, H385
- R S 301, (SOC) 401, (SOC) 459
- SOC 201, 202, 235, 310, 311, 312, 330, 331, 350, 351, (E L E, PO SC, PSYCH) 356, (R S) 371, 380, 390, 391, 392, 393, 394, 396, 397

COMPETENCY GOALS

A. Communication and Speaking Skills

A.1. English 101 and English 102

Students completing English 101 with a passing grade should be able to demonstrate the following knowledge and skills:

1. An understanding of and ability to use the full range of the writing process including invention, drafting, revising, and editing.
2. The ability to write about fictional and/or non-fictional texts, using correct form in quoting and documentation.
3. The capacity to write a unified, coherent short essay (2–4 pages) with a suitable introduction and conclusion, well-organized and sufficiently developed paragraphs, and enough detail to support their generalizations.
4. A basic control over sentence structure including not only grammatical correctness but also some evidence of syntactical maturity in terms of sentence length, complexity, and variety.
5. Basic competence in punctuation, spelling, and other mechanics.

Students completing English 102 with a passing grade should be able to demonstrate all the knowledge and skills required for English 101 plus the following:

1. The capacity to summarize, analyze, and evaluate college-level texts, including argumentative pieces expressing opinions different from their own.
2. The ability to use basic library resources including available databases to find sources.
3. The ability to incorporate existing research into their own writing, citing appropriate documentation.
4. The ability to organize and sustain the coherence of a longer (5–8 pages) expository or argumentative paper that avoids major logical fallacies, recognizes and responds to counter-arguments, and shows a rhetorical awareness of audience.
5. Skills at using varied sentence structure and length and appropriate sentence style and diction.

A.2. Oral Communication

Students will demonstrate good oral communication skills including the ability to choose and narrow a topic appropriately for the audience and occasion; communicate the thesis/specific purpose in a manner appropriate for audience and occasion; provide appropriate supporting material based on the audience and occasion; use an organizational pattern appropriate to topic, audience, occasion, and purpose; use language that is appropriate to the audience, occasion, and purpose; use vocal variety in rate, pitch, and intensity to heighten and maintain interest; use pronunciation, grammar, and articulation appropriate to the designated audience; use physical behaviors that support the verbal message.

1. Anonymous evaluators of student oral assignments from oral communication courses will report that at least 90% of students' oral communication samples (viewed on videotape) meet or exceed the criteria for oral communication competencies established by the national Speech Communication Association, as outlined in the SCA "Oral Competency" assessment instrument, and endorsed by teachers of those courses.
2. Students who have taken oral communication courses will report that receiving constructive feedback from teachers based on the "Oral Competency" assessment instrument and being given the opportunity to perform orally again after constructive feedback enabled them to improve their oral communication.
3. Teachers will report that student oral communication in "O"-designated courses improved in response to constructive feedback based on the "Oral Competency" assessments.

A.3. Writing Intensive Courses

1. Anonymous evaluators of student portfolios from W courses will report that at least 90% of students' writing samples meet or exceed the criteria for acceptable writing endorsed by teachers of those courses.

Students who have taken W courses will report the following:
2. That the writing assignments improved their learning of course material.
3. That receiving constructive feedback and being given the opportunity to revise their writing enabled them to improve their writing.
4. That they believe effective writing is important to success in their respective fields.
5. Increased confidence in their ability to meet the professional demands of writing in the workplace.

Teachers will report the following:
6. That writing assignments in W courses improved student learning of course material.
7. That student writing in W courses improved in response to constructive feedback.

B. Computer Skills

The Computer Skills requirement is intended to achieve two goals. The first goal is to prepare students for the use of computer technology in their personal and professional lives. The second goal is to assist the students in developing a set of skills in using the computer in the areas of management and organization of data and the communication of ideas.

Following completion of the Computer Skills general education requirement, students will be competent in the operation of a number of standard computer tools, including word processors, spreadsheets, and communication tools (for example, electronic mail and remote file access). Students will be able to utilize these tools to present information in an organized and effective manner. Students will also be able to interpret and accommodate current capabilities and future advances in computer technology to support their decision making.

C. Mathematical Sciences

An education that reflects only the restricted mathematical needs of the distant past is not adequate for students who will live their professional lives in the twenty-first century. Therefore, the mathematical sciences requirement is designed to achieve the following competency goals:

1. To develop in students a high level of mathematical literacy in order that they be able to adequately cope with the demands of an information-based age. This basic literacy may assume different forms, depending upon students' academic curricula. For example, developing skills in applying the methods of modern data analysis and statistical inference, mastering the more classical deterministic methods of calculus, or (for future teachers of elementary school children) to actively engage fundamental mathematical concepts in the ways that we would have them to teach: to explore, investigate, validate, discuss, represent and construct.
2. To enable students to become confident in their ability to do mathematics and to grasp the implications of the many mathematical concepts that permeate our lives—concepts such as chance, rates of change, logic, and graphs.
3. To develop in students the ability to communicate and to reason mathematically because mathematics today involves much more than calculation. Clarification of the problem, formulating alternatives, developing appropriate tools, and analyzing the consequences are all part of mathematical communication and reasoning.

D. Physical or Biological Science

Science is required of Clemson undergraduates to achieve two goals. The first goal is to expose students to the scientific philosophy that the natural world is mechanistic and largely predictable and can be systematically studied using empirical methods. Mastery of these methods requires particular reasoning skills. Following successful completion of the physical/biological science requirement, students should have an understanding of the relationship among hypotheses, experiments, and theories. They should be able to use the methods of scientific inquiry such as framing a question precisely, developing hypotheses, designing experiments, collecting and analyzing data, drawing conclusions, and making a defensible claim.

The second goal is to familiarize the students with the major principles and theories of a particular science, its historical development, and its significance for a broader world. This knowledge will give students the factual basis needed to practice the scientific method successfully in a particular discipline.

E. Humanities

The humanities is a broad category of study concerned with human nature, thought, emotion, values, interrelations, and culture. Unlike the sciences and the social sciences, the field of humanities is designed principally to insure that all students receive a balance of courses which generally are not applied or performance based. Specifically, the courses which fulfill the humanities general education requirement should build the following competencies: a reflective habit of mind, self and social awareness, a knowledge and appreciation of the development of our culture and those foreign to ours, a heightened aesthetic and ethical sensibility, an understanding of the diverse forms of expression, the ability to think critically, and good communication skills. Humanities courses should develop as many of these competencies as possible.

F. Social Science

The general education social science requirement will introduce students to human social and cultural diversity. The courses will provide students with a deeper understanding of the causes and consequences of human actions. The social science courses will also reinforce communication skills and challenge students to enhance their critical thinking and intellectual development.

MINORS, PROGRAMS, AND DEGREES

Clemson University offers 69 undergraduate degree programs in the Colleges of Agriculture, Forestry, and Life Sciences; Architecture, Arts, and Humanities; Business and Behavioral Science; Engineering and Science; and Health, Education, and Human Development.

MINORS

A minor consists of at least 15 semester credits, with no fewer than nine credits at the 300 level or higher. A student cannot major and minor in the same field or acquire a minor that is not allowed by the degree program. In programs that require a minor, courses may not be used to fulfill both the major and minor requirements. Courses used to fulfill general education requirements, however, may be counted toward the minor. Students are encouraged to contact the department offering the minor for advising. A student may specify one completed minor on the graduation application to be recorded in his/her academic record. Specific requirements are detailed below.

Accounting

A minor in Accounting requires ACCT 201, 204, 311, 312, and nine hours selected from 300- or 400-level accounting courses. Students planning to pursue the Master of Professional Accountancy degree program should select courses in consultation with the school's graduate coordinator.

Adult/Extension Education

A minor in Adult/Extension Education requires AG ED 403, 440, 445, and six additional credits selected from the following: AG ED 407, 428, 450, 482, PRTM 308.

Aerospace Studies

A minor concentration in Aerospace Studies requires A S 109, 110, 209, 210, 309, 310, 409, and 410. Completion of A S Leadership Laboratory and participation in cadet activities are mandatory. Students must compete for an allocation and be accepted into the Professional Officer Course before enrolling in A S 309. (A S 100 and 200 levels may be taken concurrently in the sophomore year.)

African American Studies

A minor concentration in African American Studies requires 15 credits at the 300 and 400 levels, distributed as follows:

Group I—Three credits from A A S 301, 498.

Group II—Three credits from GEOG 330, HIST 338, 339, 438.

Group III—Three credits from ENGL 482, 483, HIST 311, 312, PO SC 381, SOC 460, THEA 317.

Group IV—Three credits in any approved course in social sciences.

Group V—Three credits in any approved course in the humanities.

No course used to meet the requirements of a disciplinary major may be used to meet the African American Studies minor requirements. The courses in this minor are to be scheduled in consultation with the appropriate advisors. African American Studies advisors will provide all affected advisors with a list of approved courses prior to registration.

Agricultural Business Management

A minor in Agricultural Business Management requires AP EC 302, 309, 319, and at least two courses selected from AP EC 308, 351, 402, 409, 433, 452, 456, 460.

Agricultural Mechanization and Business

A minor in Agricultural Mechanization and Business requires six credit hours selected from AG M 205, 206, 301, 303; and nine credit hours from AG M 401, 402, 403, 406, 452, 460.

Anthropology

A minor concentration in Anthropology requires ANTH 201 and 15 hours from the following courses: ANTH 301, 320, 351, 401, 403, SOC 433. At least one course must be at the 400 level.

Aquaculture, Fisheries, and Wildlife Biology

A minor in Aquaculture, Fisheries, and Wildlife Biology requires W F B 300; 350; six additional hours selected from 300-level or higher W F B courses, except 463 and 490; and three credits selected from AP EC 475, BIOSC 464, 468, 470, 472, 477, ENTOX 400, FOR 415.

Beef Cattle Production

A minor concentration in Beef Cattle Production requires AVS 202, 370, 390, 401; two credits from AVS 108, 210, 375, 455; and three credits from AVS 310, 353/354, 453, 470.

Biochemistry

A minor concentration in Biochemistry requires BIOCH 301, 423 or 431, 432, 433, 434 (13 credits), plus at least two credits from any other biochemistry courses at the 300 level or above, BIOSC 416, or a section of BIOSC 493 designated as oriented towards biochemistry or molecular biology.

Bioengineering

A minor in Bioengineering requires at least 15 credits and must include BIO E 302, 320, 401. The remaining six credits may be chosen from B E 430, BIO E 201, 420, 450, BIOSC 222, 223, 458, 459, C M E 210, or E M 304, 320, or M E 301.

Biological Sciences

A minor in Biological Sciences requires 15 credits and must include both a lecture and corresponding laboratory in animal diversity (BIOSC 302/306 or 303/307) and a lecture and corresponding laboratory in plant diversity (BIOSC 304/308 or 305/309); remaining credits (minimum of seven) must be selected from BIOCH, BIOSC, or GEN courses numbered 300 or higher.

Business Administration

A minor in Business Administration requires ACCT 201, ECON 200 (or ECON 211 and 212), FIN 306, LAW 322, MGT 301, MKT 301. (If a student's curriculum requires ECON 211 and 212, rather than the broader survey course, then the student has already satisfied the economics requirement.)

Chemistry

A minor concentration in Chemistry requires CH 101, 102, and 15 additional credits in Chemistry, at least nine of which must be at the 300 or 400 level, with the courses selected in consultation with the Department of Chemistry.

Cluster

The Cluster minor allows students a somewhat wider choice of course materials than is possible with the conventional subject-matter minor. The general requirement for the Cluster minor is 15 credits in courses numbered higher than 300, except where noted differently, chosen according to one of the plans listed below. Courses within the student's major area may not be included in the Cluster minor.

Group I—Social Sciences: anthropology, economics, geography, history, political science, psychology, sociology.

Group II—Life Sciences[1]*:* biochemistry, biological sciences, genetics, microbiology.

Group III—Physical Sciences[1]*:* chemistry, geology, physics.

Group IV—Engineering[1]*:* courses in all engineering majors plus engineering mechanics and engineering graphics.

[1]No course in the 100 series is acceptable toward the Cluster minor and not more than six hours in the 200 series are acceptable.

Communications

A minor concentration in Communications requires 18 credits distributed as follows:

General Communications Option—ENGL 231, 312, and either SPCH 360 or 361, PHIL 102, and six elective credits.

Advertising Option—AP EC 351, ENGL 231 or 304, G C 104, PSYCH 330, and five elective credits.

Commerce Option—AP EC 351 or THRD 468, ENGL 231 or 304, SPCH 360 or 361, MGT 301, and six elective credits.

Politics Option—ENGL 312 and either SPCH 360 or 361, P O SC 341, 343, and six elective credits.

Elective credits are approved by the Chair of the Department of English or his/her representative.

Computer Science

A minor in Computer Science requires CP SC 212 and 12 additional credits in computer science of which at least nine credits must be at the 300 level or higher.

Crop and Soil Environmental Science

A minor in Crop and Soil Environmental Science requires AGRIC 104, CSENV 202, and nine or more credits at the 300 level or higher.

Early Intervention Specialist

The following coursework is required to meet the credentialing standard for Early Intervention Specialist: ED F 336, ED F 334 or PSYCH 340, ED SP 370, 468, HLTH 410, 411, 420, SOC 311.

Economics

A minor concentration in Economics requires ECON 314, 315, and nine additional credits from economics courses numbered 300 or higher.

Elementary Education

A minor in Elementary Education requires ED 100, ED F 301, 302, 334, ED SP 370, READ 460, and one of the following: ED 451, 452, 487, 488.

It is recommended that students planning to work toward certification in elementary education also take ED 401 during the semester they take ED 460. (This minor does not certify one to teach.)

Note: Students wishing to enroll in 400-level courses must meet the requirements for admission to the professional level: (1) completion of 60 hours, (2) passing scores in all areas of the Praxis 1 Pre-Professional Skills Test (PPST), and (3) a minimum cumulative grade-point ratio of 2.5.

English

A minor in English requires 15 credits in English above the sophomore level, arranged as follows:

Group I—ENGL 411.

Group II—Three credits from ENGL 405, 406, 407, 408, 409, 410, 412, 413, 414, 415, 416, 417, 418.

Group III—Three credits from ENGL 422, 423, 424, 425.

Group IV—Six additional credits above the sophomore level, including at least three credits from the 400 level.

Department certification of proficiency in composition is required. (See discussion under major concentration in English.)

Entomology

A minor in Entomology requires ENT 301 and 12 credits in entomology courses at the 300 level or higher.

Entrepreneurship

A minor in Entrepreneurship consists of 15 credits including the following: ACCT 201, ECON (MGT) 306 or 314, and FIN 306. Six credit hours from one of the following tracks are also required:

Planning—MKT (E L E) 314, MGT (E L E) 315

Experiential—E L E 301, 401

Foundations—ECON (E L E) 321, SOC (E L E) 356

Note: Not open to majors in the School of Business and Leadership, except BA in Economics.

Environmental Engineering

A minor in Environmental Engineering requires at least 15 credits as follows: EE&S 401 or EN SP 200, at least six credits selected from Group I, and at least three credits from Group II. The remaining three credits may be selected from either group. All courses are to be chosen in consultation the the Department of Environmental Engineering and Science.

Group I—EE&S 402, 410, 411, 430, 484, 485, 486

Group II—B E 322, C E 342, 447, CH 223, 411, 413, CH E 401, 450, EN SP 400, ENT (ENTOX) 430, ENTOX 400, GEOL 408, MICRO 305, 410

Environmental Science and Policy

A minor in Environmental Science and Policy requires at least of 18 credits including EN SP 200, 400, and at least 12 credits from the following:

Group 1—Science and Engineering: at least six credits: BIOSC 410, 441, 442, 443, 446, CH 413, CSENV 202, (B E) 408, 475, 490, EE&S 401, 402, 430, 485, ENT 300, 420, (ENTOX) 430, ENTOX 400, 421, FOR 206, W F B 414.

Group 2—Resource Management: at least two credits: AGRIC (EN SP) 315, B E 364, C R D 357, C M E 323, CSENV 404, EE&S 484, ECON 319, FOR 315, 406, GEOL 300, W F B 306, (BIOSC) 313, 350, 412, 462.

Group 3—Environmental Policy and Social Impacts: at least two credits: AP EC 433, ANTH 401, C R P 405, EN SP 431, 471, 472, HIST (F&RR) 392, HLTH 431, LAW 429, PHIL 345, PSYCH 355, R S (SOC) 401, W F B 430.

Film Studies

A minor in Film Studies requires 15 credits in ENGL above the sophomore level, arranged as follows: ENGL 357, 450, 451, 452; and one of the following: ART 313, ENGL 348, 430, 453, 459, 483, or other course as approved by the departmental Director of Undergraduate Studies.

Financial Management

A minor in Financial Management requires FIN 305, 306 or 311, 308, 312, and one of the following: FIN 307, 399, or any 400-level FIN course.

Fine Arts

A minor in Fine Arts requires HUM 301, 302, and 15 credits from the following courses, of which at least nine credits must be earned in courses numbered 300 or higher, and no more than nine credits in any discipline selected from the following: A A H (all courses), ART (all courses), ENGL 345, 346, 357, 445, 446, HUM 306, 309, L S 190, MUSIC (all courses), SPCH 363, 369, THEA (all courses).

Food Science

A minor concentration in Food Science requires FD SC 214, 401, and seven additional credits in food science courses numbered 300 or higher.

Forest Products

A minor in Forest Products requires 15 credits which must include the following: FOR 441, 442, 443; with the remaining credits being selected from the following: FOR 221 (not for Forest Resources Management majors), 341, 440, 444, 446, 447. Other courses at the 300 level or above may be selected with a Forest Products advisor's approval.

Forest Resource Management

A minor in Forest Resource Management requires either of the following:

1. FOR 305, 310, 315, and a minimum of six credits, selected with a forestry faculty advisor's approval, from any forestry course (for a total of 16 credits).
2. A formal program of study developed by the student and forestry advisor, containing a minimum of 15 credits of forestry courses. Nine credits must be at the 300 level or higher.

Geography

The Geography minor consists of GEOG 101 or 103 plus 15 credits of geography at the 200, 300, or 400 level. At least one 400-level geography course must be taken. One of the following courses may be taken as part of the 15-credit, upper-level requirements but may not be substituted for the required 400-level geography course: R S (SOC) 401, (SOC) 471.

Geology

A minor concentration in Geology requires GEOL 101, 102, 103, and 12 additional credits drawn from 300-level and 400-level geology courses; at least one 400-level course must be included.

Great Works

The Great Works minor requires G W (ENGL) 301 plus one course from each of the following groups. A minimum of nine credits must be at the 400 level.

Group I—Classical Civilization: Three credits from ENGL 403, 404, (SPCH) 491, HIST 354, 355, 450, PHIL 315, PO SC 451.

Group II—Post-classical Literature: Three credits from ENGL 408, 411, 414, 416, FR 400, 408, G W 403, GER 400, SPAN 303, 401.

Group III—Philosophy, Religion, and Social Thought: Three credits from ENGL 350, HIST 471, PHIL 316, 317, PO SC 452, REL 301, 302, 401.

Group IV—The Arts: Three credits from A A H 423, 424, HUM 301, 302, MUSIC 415, 416, THEA 315, 316.

Group V—The Sciences: ENGL 434

Health Science

A minor in Health Science requires HLTH 298 plus 12 additional credits drawn from the 300- and 400-level health courses; at least one 400-level course must be included.

History

A minor concentration in History requires 15 credits in history at the 300 and 400 level. Three credits at the 400 level must be included.

Horse Production

A minor in Horse Production requires AVS 202, 370, 412, and eight credits from the following: AVS 205, 309, 310, 390, 405, 407.

Horticulture

A minor concentration in Horticulture requires HORT 101 and 12 additional credits of horticulture courses (excluding HORT 271, 408, 471), nine credits of which must be at the 300 level or higher.

Human Resource Management

A minor concentration in Human Resource Management requires 18 credits as follows: MA SC 310 or equivalent, MGT 301, 307, 400; plus two of the following: MGT 416, 425, 431, 435.

International Engineering and Science

The minor in International Engineering and Science, open to students in any major in the College of Engineering and Science, requires:

1. Completion of a foreign language through at least 202 *and*

2. Either (a) nine credits of engineering or science courses at the 300 level or higher transferred from a foreign institution during an approved study-abroad program of at least three months, *or*
(b) an approved international internship or research program in engineering or science of at least three months duration, plus nine credits chosen from 300 level or higher foreign language courses; ECON 310, 412, 413; and PO SC 361, 362, 371, 373, 375, 472, 477, 478.

The international study, internship, or research program must be approved in advance by the Associate Dean for Undergraduate Studies of the College of Engineering and Science.

International Politics

A minor in International Politics requires PO SC 102 or 104; 361; and 12 additional credits chosen from the list below, of which at least three credits must be from Group I and at least three credits from Group II:

Group I—Comparative Politics: PO SC 371, 373, 471, 472, 476, 477, 478.

Group II—International Politics: PO SC 362, 363, 367, 428, 457, 465.

With the approval of the Political Science department chair, PO SC 310, 311, 389, 479, and 489 may be applied to the requirements for the International Politics minor. Students majoring in Political Science may not minor in International Politics.

Legal Studies

A minor in Legal Studies requires 15 credits at the 300–400 level at least six credits of which must be selected from Group I, at least six credits of which must be selected from Group II, and the remaining three credits of which may be selected from either group at the student's option[1]:

Group I[1]—HIST 328, 329, 496, PHIL 343, PO SC 432, 433, 434, SOC 390.

Group II—ECON 402, LAW 312, 313, 322, 333, 401, 405, 420, 429, 499.

[1]Additional courses may be approved by a committee composed of a representatives selected by the Dean of the College of Architecture, Arts, and Humanities and by the Dean of the College of Business and Behavioral Science.

Management

A minor in Management requires 18 credits as follows: MA SC 310 or equivalent, MGT 301, 307, 390, 418, 422.

Marketing

A minor concentration in Marketing requires MKT 301, 302, 426 or 428 or 429, and six additional credits in marketing.

Mathematical Sciences

A minor in Mathematical Sciences requires MTHSC 208 and 12 additional credits in mathematical sciences courses numbered 300 or higher.

Microbiology

A minor concentration in Microbiology requires MICRO 305 and eleven additional credits drawn from 400-level microbiology courses.

Military Science

A minor in Military Science requires at least 17 credits including M S 101, 102, 202, 301, 302, 401, 402; M S 201 or one of the following CP SC 105, 120, ENGL 231, 304, 314, SPCH 250. One of the following is also required: HIST 390, 400, PO SC 428. Completion of Military Science Leadership Laboratory and participation in cadet activities is mandatory. (M S 100 and 200 levels may be taken concurrently in the sophomore year.)

Modern Languages

A minor concentration in Modern Languages requires 15 credits in one modern language from courses at the 300 and 400 levels, including at least one literature course at the 400 level. In French, one of the 300-level courses must be FR 305.

Music

A minor concentration in Music requires MUSIC 151, 152, 205, 206, 251, 252; 415 or 416; four semesters of ensemble, totaling four credits, selected from MUSIC 344, 361, 362, 363, 364, 373, 369, 370; and one three-hour 300/400-level music course.

Natural Resource Economics

A minor in Natural Resource Economics requires AP EC 403 and C R D 357 and three courses selected from the following: AP EC 308, 352, 402, 433, 452, AP EC (C R D) 412, R S (SOC) 401.

Operations Management

A minor in Operations Management requires 18 credits as follows: MA SC 310 or equivalent, MGT 301, 390, 400, 404; plus either MGT 402 or 408.

Packaging Science

A minor in Packaging Science requires 18 credits and must include PKGSC 102, 202, 204, and 206. The remaining nine credits may be selected from FD SC 401, 402, FOR 441, 442, 443, G C 405, 406, PKGSC 368, 401, 404, 454, 464, 466.

Parks, Recreation, and Tourism Management

A minor in Parks, Recreation, and Tourism Management requires one of the following options:

Community Leisure Services—PRTM 301 (preferred) or 101; PRTM 205, 321, and nine additional credits from PRTM 307, 400, 403, 421, 441.

Non-profit Leadership—CO-OP 101 (PRTM 405 may be substituted.), NPL 300, and one course selected from each of the following areas:
I—PRTM 308, SPCH 348, 480
II—ED F 334, 335, PSYCH 340, SOC 350
III—HLTH 401, MKT 428, 429, PRTM 421
IV—MGT 307, PO SC 427, PRTM 400, PSYCH 368
V—HLTH 440, PHIL 344, PO SC 321, PRTM 305, 321

Recreation Resource Management—PRTM 301 (preferred) or 101; PRTM 270, 330, 474, and six additional credits from PRTM 320, 403, 430, 431.

Sport Management—PRTM 301 (preferred) or 101; PRTM 205, 254, 454, and six credits from PRTM 305, 307, 441, 452, 453.

Therapeutic Recreation—PRTM 301 (preferred) or 101; PRTM 311 and 12 additional credits in PRTM, nine of which must be taken from PRTM 316, 318, 412, 413.

Travel and Tourism—PRTM 301 (preferred) or 101; PRTM 342; 12 additional credits from PRTM 343, 344, 349, 445, 446, either (GEOG) 430 or 447.

Philosophy

A minor in Philosophy requires 15 credits in philosophy. These may include one 100-level philosophy course (PHIL 101, 102, or 103). PHIL 401 or 402 must be included.

Physics

A minor concentration in Physics requires PHYS 122, 221, 222, and nine additional credits in physics courses at the 300 level or higher.

Plant Pathology

A minor in Plant Pathology requires PL PA 401 and 12 credits from the following: any 300/400-level PL PA courses, BIOSC 418, 425, 426, I P M 401, MICRO 305.

Political Science

A minor in Political Science requires PO SC 101, 102, or 104 plus 15 additional credits at the 300–400 level, nine of which must be selected from three different fields of political science as follows:

American Government—PO SC 403, 405, 432, 442.

Comparative Politics—PO SC 371, 373, 471, 472, 476, 477, 478.

International Politics—PO SC 361, 362, 363, 428, 465.

Political Theory—PO SC 451, 452, 453.

Public Policy and Public Administration—PO SC 302, 321, 421, 423, 424.

At least one 400-level course must be included. No more than a total of three credits from PO SC 310, 311, and 312 may be applied to the requirements for a Political Science minor.

Poultry Science

A minor concentration in Poultry Science requires AVS 201 and 12 additional credits from AVS 110, 323, 355, 400, 402, 451, 452, 458.

Psychology

A minor in Psychology requires PSYCH 201 and 15 credits from 300- and 400-level psychology courses. At least one 400-level course must be included.

Public Policy

A minor in Public Policy requires PO SC 321, 421, and 430, plus nine hours in courses dealing with specific policy domains and approved by the Department of Political Science.

Religion

A minor in Religion requires 15 credits. REL 101 or 102 must be included. (Both may be included.) Nine credits must be at the 300-level or above. REL 401 or 402 must be included. PHIL 303 may be included.

Science and Technology in Society

A minor in Science and Technology in Society requires 15 credits, at least six of which must be at the 400 level. No course used to meet the requirements of a disciplinary major may also be used to meet the Science and Technology in Society minor requirements. See advisor for list of approved courses.

Screenwriting

A minor in Screenwriting requires 15 credits in ENGL above the sophomore level as follows: ENGL 348, 357, 448 (six credits); and one of the following: ENGL 450, 451, 452, 453, THEA 347, or other course as approved by the departmental Director of Undergraduate Studies.

Secondary Education

A minor in Secondary Education requires ED 100, ED F 301, 302, 335, ED SP 370, READ 498, and one of the following: ED 424, 425, 426, 427, 428.

Sociology

A minor concentration in Sociology requires SOC 201 and 15 credits from sociology and rural sociology courses numbered 300 or higher. At least one 400-level course must be included.

Spanish-American Area Studies

A minor concentration in Spanish-American Area Studies requires the equivalent of SPAN 202, plus 15 credits distributed as follows: six credits from HIST 340, 341, 342, 440, GEOG 340; six credits from SPAN 308, 311, (PO SC) 382, (PO SC) 385, 403, 422, 435; and ECON 410.

Speech and Communication Studies

A minor in Speech and Communication Studies requires SPCH 150 and 12 additional hours in Speech, nine of which must be at the 300–400 level. Three hours at the 400 level must be included.

Textiles

A minor in Textiles requires 15 credits from the following: TEXT 201, 202, 460, and any other approved textile course such as TEXT 308, 314, 416, 426, 428, 440, 470, 471, 472, 475, 476.

Theatre

A minor concentration in Theatre requires 20 credits arranged as follows: three credits of dramatic literature and history (ENGL 404, 410, 411, 412, 430, THEA 347); three credits of theatre history (THEA 315, 316, 317); six credits in a sequence (THEA 278/479, 315/316, 347/447, 372/472, 376/476, 377/477 or 487 or 497); six credits in THEA at the 300–400 level; and two credits of THEA 279.

Urban Forestry

A minor in Urban Forestry requries a minimum of 16 credits, distributed as follows:

Group I—FOR (HORT) 427, 450, 480, HORT 208.

Group II—A minumum of three credits selected from C R P 411, 415, 472, HORT 308.

Group III—A minimum of three credits selected from ENT 401, HORT 303, PL PA 402.

Women's Studies

A minor in Women's Studies requires 15 credits at the 300 and 400 level, distributed as follows:

Group I—Six credits: W S 301 and 459 or 498.

Group II—Six credits chosen from core courses: ENGL 380, 436, HIST 318, PSYCH 308, SOC 461, and any additional courses approved for Group II.

Group III—The final three credits may be earned by taking any approved Women's Studies minor course.

Courses selected in Groups II and III must represent at least two disciplines. The courses for this minor are to be scheduled in consultation with the appropriate advisors. The Women's Studies advisor will provide all affected advisors with a list of approved courses prior to registration.

Writing

A minor in writing requires 15 credits as follows:

Business and Technical Option—AP EC 351 or G C 104, CP SC 120, ENGL 304 or 314, 490, 495.

Journalism Option—ENGL 231, 333, 334, 335; one of the following: AP EC 351, CP SC 120, G C 104, ENGL 217, 304, 312, 314, PHIL 102, SPCH 250, THRD 468, and any course approved by the Chair of the English Department.

Writing Pedagogy Option—ENGL 312, 400, 401, 485; elective (three credits), any 300- or 400-level writing course offered by the Department of English.

Creative Writing Options

Drama—THEA (ENGL) 347, 447 (six credits), ENGL 430, and one of the following: ENGL 312, 410, 411.

Fiction—ENGL 345, 445 (six credits), 432, and one of the following: ENGL 312, 418, 425, 426.

Poetry—ENGL 346, 446 (six credits), 431, and one of the following: ENGL 312, 413, 416, 417.

PREPROFESSIONAL STUDIES

Clemson University will award the degree of Bachelor of Arts or Bachelor of Science in Preprofessional Studies to a student who is pursuing a degree in a professional school. The student must have also satisfactorily completed three years of undergraduate work in an appropriate curriculum and the first year of work in an accredited medical, dental, veterinary, or other accredited professional school, provided the student fulfills the requirements for the three-year program as follows and the other specified conditions are met.

1. At least two of the three years of preprofessional work, including the third year, must be taken in residence at this University.

2. A minimum of three years of undergraduate work (i.e. preprofessional school credit) must be presented.

3. Normal progress must have been made toward fulfilling the degree requirement of the curriculum in which the student is enrolled at Clemson.

4. The student applying for the Bachelor of Arts or Bachelor of Science in Preprofessional Studies must be recommended by the college at Clemson in which the curriculum that he/she is majoring as a Clemson student is located or by the college in which three years of normal progress toward a degree can be identified.

5. If the combination of preprofessional work taken and the work in the first year of professional school is equivalent to that which is required in some other bachelor's degree program at Clemson, the college concerned may recommend the other bachelor's degree.

The above requirements and conditions became effective July 1, 1974, and will apply to all students who satisfy these requirements and conditions after that date.

A Clemson student having left the University before receiving the bachelor's degree (prior to July 1, 1974) and having enrolled immediately in an accredited professional postgraduate school may apply for a bachelor's degree from Clemson and have his/her application considered on an individual basis. The college(s) at Clemson considering the application are authorized to examine the student's entire record in both preprofessional and professional studies and exercise their own judgment concerning the three-year requirement for Preprofessional Studies.

SECOND BACCALAUREATE DEGREE

To complete a second baccalaureate degree, a student must complete a minimum of 30 semester hours at Clemson in addition to the greater number of hours required for either degree and satisfy all course and grade requirements for the second degree.

DOUBLE MAJOR

A student in a Bachelor of Arts degree program may be awarded a single baccalaureate degree with a double major. The two majors may be within a single college or may involve two colleges but are limited to Bachelor of Arts degree programs.

GRADUATE DEGREES

Graduate degrees are available from all five colleges in addition to the interdisciplinary programs offering degrees in Fine Arts in Computing and Policy Studies. One hundred, sixteen graduate degree programs are offered. The degrees of Doctor of Philosophy, Doctor of Education, Education Specialist, Master of Arts, Master of Science, Master of Agricultural Education, Master of Agriculture, Master of Architecture, Master of Business Administration, Master of City and Regional Planning, Master of Construction Science and Management, Master of Education, Master of Electronic Commerce, Master of Engineering, Master of Fine Arts, Master of Fine Arts in Computing, Master of Forest Resources, Master of Health Administration, Master of Human Resource Development, Master of Industrial Education, Master of Parks, Recreation, and Tourism Management, Master of Professional Accountancy, and Master of Public Administration are awarded to students who satisfactorily complete prescribed graduate programs.

For further information concerning advanced degrees, see the *Graduate School Announcements*, available from the Graduate School Office.

COLLEGE OF AGRICULTURE, FORESTRY, AND LIFE SCIENCES

The College of Agriculture, Forestry, and Life Sciences offers a broad range of academic degree programs providing a sound knowledge base and technical expertise in the basic and applied sciences including the life sciences. The Bachelor of Science degree is available in 14 academic programs; the Bachelor of Arts is offered in Biological Sciences.

Preprofessional Health Studies non-degree programs are offered in Premedicine, Prepharmacy, Prerehabilitation Sciences, and Preveterinary Medicine. A bachelor's degree can be obtained by fulfilling additional requirements specified by the University.

The undergraduate academic programs include Agricultural and Applied Economics with concentrations in Agricultural Economics and Community and Economic Development; Agricultural Education; Agricultural Mechanization and Business; Animal and Veterinary Sciences with concentrations in Dairy Business, Equine Business, Food Animal Business, Poultry Business, and Preveterinary and Science; Aquaculture, Fisheries, and Wildlife Biology; Biochemistry; Biological Sciences; Biosystems Engineering; Food Science; Forest Resource Management; Horticulture; Microbiology with a Molecular Biology concentration; Packaging Science; and Turfgrass.

Minors

Minors are available to students who wish to broaden their educational background and enhance their expertise. (See page 46 for acceptable minors.)

Honors Program

Students with a cumulative grade-point ratio of 3.4 and above are urged to consider enrolling in the Honors Program. The College offers Honors designated courses and an opportunity to do a research project under the direction of a faculty mentor in fulfillment of Senior Departmental Honors. For more information, contact the Calhoun Honors College Office in Brackett Hall.

Scholarships

A range of scholarships is available to students who excel in their academic performance. Information on scholarships and financial aid can be obtained from specific departments in the College or from the Student Financial Aid Office in Sikes Hall.

Student Services

The college has a comprehensive Student Service Center offering a career library, company literature, career search technology, and video/audio resources.

AGRICULTURAL AND APPLIED ECONOMICS

Bachelor of Science

AGRICULTURAL ECONOMICS

The Agricultural Economics curriculum emphasizes a strong background in economics with applications to production agriculture, agribusiness, natural resources, and the environment. Courses are also included in basic agricultural and biological sciences, liberal arts, and business. Students have 18 hours of electives to use to further individual specialization or to broaden the educational experience.

Employment opportunities for graduates in Agricultural Economics are many and diverse. Private sector opportunities include agricultural production, banking, finance, marketing, and public relations. Public sector opportunities include national/local organizations, government agencies, educational institutions, and cooperative extension services. Graduates have also begun businesses or returned to family-owned businesses. This major also provides an excellent background for professional or graduate study in several disciplines.

Students in the Agricultural Economics curriculum take a basic set of courses during the freshman and sophomore years. During the junior and senior years, students concentrate in one of five emphasis areas: Agricultural Business, Economics, International Trade and Development, Production, and Real Estate. Students should select an emphasis areas by the end of the sophomore year.

Freshman Year

First Semester

3 - AGRIC 103 Intro. to Animal Industries
3 - AGRIC 105 Agriculture and Society
3 - ENGL 101 Composition I
3 - MTHSC 102 Intro. to Mathematical Analysis
4 - Science Requirement[1]
16

Second Semester

3 - AGRIC 104 Introduction to Plant Sciences
3 - AP EC 202 Agricultural Economics
3 - CP SC 120 Intro. to Information Technology
3 - ENGL 102 Composition II
4 - Science Requirement[1]
16

Sophomore Year

First Semester

3 - AP EC 302 Economics of Farm Management
3 - ECON 212 Principles of Macroeconomics
3 - Accounting Requirement[2]
6 - Humanities Requirement E.1 and E.2[1]
3 - Elective
18

Second Semester

3 - AP EC 308 Quantitative Applied Economics
3 - AP EC 309 Econ. of Agricultural Marketing
3 - EX ST 301 Introductory Statistics
3 - Accounting Requirement[2]
3 - Oral Communication Requirement[1]
3 - Elective
18

Junior Year

First Semester

3 - ECON 314 Intermediate Microeconomics
3 - EX ST 462 Statistics Applied to Economics
3 - R S 301 Rural Sociology *or*
    3 - R S (SOC) 459 The Community
3 - Emphasis Area[3]
3 - Writing Intensive Requirement[1]
15

Second Semester

3 - AP EC 420 World Agricultural Trade *or*
    3 - AP EC 460 Agricultural Finance
3 - ECON 302 Money and Banking *or*
    3 - ECON 315 Intermed. Macroeconomics
3 - LAW 312 Commercial Law *or*
    3 - LAW 322 Legal Environment of Business
6 - Emphasis Area[3]
3 - Elective
18

Senior Year

First Semester

3 - AP EC 402 Production Economics
3 - AP EC (CSENV) 426 Crop. Systems Analysis
3 - AP EC 452 Agricultural Policy
3 - Emphasis Area[3]
3 - Elective
15

Second Semester

3 - AP EC 456 Prices
6 - Emphasis Area[3]
6 - Elective
15

131 Total Semester Hours

[1]See General Education Requirements.

[2]ACCT 201 and 202 or 307.

[3]See advisor. An emphasis area should be selected by the end of the sophomore year in consultation with advisor. Select 18 credits from one of the following:

Agricultural Business—MGT 301, 307, MKT 301, and nine credits from a department approved list.

Economics—ECON 430, MTHSC 207, 210, and nine credits from a department approved list.

International Trade and Development—Six credits of AP EC 490 or two courses of the same foreign language, ECON 310 or 412, and nine credits from a department approved list.

Production—Eighteen credits from a department approved list.

Real Estate—AP EC 313, 413, FIN 307, 417, and six credits from a department approved list.

AGRICULTURAL AND APPLIED ECONOMICS

Bachelor of Science

COMMUNITY AND ECONOMIC DEVELOPMENT

The Bachelor of Science program in Community and Economic Development provides career opportunities for social science administration, management, outreach, and research. A Bachelor of Science degree with a major in Community and Economic Development facilitates employment with local, state, regional, federal, and international agencies; research and consulting firms; financial institutions; foundations and councils; public and private utilities; and

organizations requiring entrepreneurial skills. This major provides an excellent background for professional and graduate study in several disciplines.

Associations between natural resources and social, economic, and political institutions are investigated. This curriculum provides the conceptual, analytical, and pragmatic qualifications to succeed as an economic development specialist. Students receive practical training, and internships are available to complement coursework.

Freshman Year

First Semester

3 - AGRIC 105 Agriculture and Society
3 - ENGL 101 Composition I
3 - MTHSC 102 Intro. to Mathematical Analysis
3 - PO SC 102 Introduction to Global Issues
4 - Science Requirement[1]
16

Second Semester

3 - ENGL 102 Composition II
3 - GEOG 103 World Regional Geography
3 - Computer Skills Requirement[2]
3 - Humanities Requirement E.2[2]
4 - Science Requirement[1]
16

Sophomore Year

First Semester

3 - ACCT 201 Financial Accounting Concepts
3 - AP EC 202 Agricultural Economics *or*
3 - ECON 211 Principles of Microeconomics
3 - EX ST 301 Introductory Statistics
3 - Humanities Requirement E.1[2]
3 - Oral Communication Requirement[2]
15

Second Semester

3 - AP EC 257 Natural Resources, Environment, and Economics
3 - ECON 212 Principles of Macroeconomics
3 - R S 301 Rural Sociology
3 - Writing Intensive Requirement[2]
4 - Elective
16

Junior Year

First Semester

3 - AP EC 352 Public Finance
3 - C R D (AP EC, HLTH) 361 Introduction to Health-Care Economics
3 - EX ST 462 Statistics Applied to Economics
5 - Emphasis Area[3]
3 - Social Science Requirement[4]
17

Second Semester

3 - C R D 357 Natural Resources Economics
3 - MKT 301 Principles of Marketing
3 - Advanced Social Science Requirement[5]
3 - Emphasis Area[3]
4 - Elective
16

Senior Year

First Semester

3 - C R D (AP EC) 411 Regional Impact Analysis
3 - R S (SOC) 471 Demography
3 - Advanced Marketing Requirement[6]
3 - Emphasis Area[3]
3 - Planning Requirement[7]
2 - Elective
17

Second Semester

3 - C R D (AP EC) 412 Spatial Competition and Rural Development
3 - C R D (AP EC) 491 Internship, Agribusiness, and Community and Rural Development
3 - R S (SOC) 401 Human Ecology *or*
3 - R S (SOC) 459 The Community
6 - Emphasis Area[3]
15

128 Total Semester Hours

[1]A two-semester sequence in the same physical or biological science, each including a laboratory.

[2]See General Education Requirements.

[3]See advisor.

[4]Select from 300-level courses in geography, history, political science, psychology, or sociology.

[5]Select from 400-level courses in geography, history, political science, psychology, or sociology.

[6]Select from MKT 314, 423, 427, 428, 429.

[7]Select from C R P 411, 415, 472.

AGRICULTURAL EDUCATION

Bachelor of Science

Agricultural Education provides broad preparation in agricultural sciences and professional education, including communications and human relations skills. In addition to required courses, students may select a minor. (See page 46.)

The Bachelor's degree prepares students for professional education positions in the mainstream of agriculture including teaching, cooperative extension service, and government agricultural agencies. This degree also prepares students for other educational work such as agricultural missionary, public relations, and training officers in agricultural industry.

Freshman Year

First Semester

3 - AGRIC 103 Intro. to Animal Industries
3 - AGRIC 200 Agricultural Applications of Microcomputers
4 - BIOL 103 General Biology I
3 - ENGL 101 Composition I
3 - Mathematical Sciences Requirement[1]
16

Second Semester

1 - AG ED 100 Orientation and Field Experience
3 - AGRIC 104 Introduction to Plant Sciences
4 - BIOL 104 General Biology II
3 - ENGL 102 Composition II
3 - Mathematical Sciences Requirement[1]
1 - Elective
15

Sophomore Year

First Semester

3 - AG ED 201 Intro. to Agricultural Education
3 - AG M 205 Principles of Farm Shop *or*
3 - AG M 206 Agricultural Mechanization
4 - CH 101 General Chemistry *or*
4 - CH 105 Beg. Gen. and Organic Chemistry
3 - HIST 322 History of Technology *or*
3 - HIST 323 Hist. of American Technology
3 - Humanities Requirement E.2[1]
16

Second Semester

3 - AP EC 202 Agricultural Economics
4 - CH 102 General Chemistry *or*
4 - CH 106 Beg. Gen. and Organic Chemistry
3 - HORT 208 Landscape Appreciation
3 - Literature Requirement[2]
3 - Elective
16

Junior Year

First Semester

3 - AG M 301 Soil and Water Conservation *or*
3 - AG M 452 Farm Power
3 - AP EC 302 Economics of Farm Management
4 - CSENV 202 Soils
4 - ENT 301 General Entomology
6 - Minor[3]
20

Second Semester

3 - AVS 370 Principles of Animal Nutrition
3 - ED F 302 Educational Psychology
3 - SPCH 250 Public Speaking
6 - Minor[3]
3 - Writing Intensive Requirement[1]
18

Senior Year

First Semester

1 - AG ED 400 Supervised Field Experience II
2 - AG ED 423 Curriculum
2 - AG ED 425 Teaching Agricultural Mechanics
3 - FOR 305 Elements of Forestry
3 - PL PA 401 Plant Pathology
3 - Minor[3]
4 - Elective
18

Second Semester

3 - AG ED 401 Methods in Agricultural Educ.
12 - AG ED 406 Directed Teaching
3 - Elective
18

137 Total Semester Hours

[1]See General Education Requirements.

[2]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[3]A minor is recommended. See advisor for available minors and course requirements.

CLEMSON UNIVERSITY LIBRARY

AGRICULTURAL MECHANIZATION AND BUSINESS

Bachelor of Science

The Agricultural Mechanization and Business major provides a program for students who desire training in areas relevant to dynamic agricultural enterprise. The program is organized with strength in both business management and technical support of agriculture and agribusiness. To produce well rounded individuals with good communication skills, the curriculum includes courses in the humanities, social sciences, English composition, and public speaking.

Graduates in Agricultural Mechanization and Business find meaningful and remunerative employment in a variety of situations directly and indirectly related to agricultural production, processing, marketing, and the many services connected therewith. Farming and technical sales in the agricultural, industrial, and heavy equipment industries are frequently chosen careers.

By completing this curriculum, graduates will have fulfilled the requirements for an Agricultural Business Management minor. Contact the Student Records Office to have the minor recorded.

Freshman Year

First Semester
1 - AG M 101 Introduction to AG M
3 - AGRIC 103 Intro. to Animal Industries
4 - BIOL 103 General Biology I
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
3 - Mathematical Sciences Requirement[1]
18

Second Semester
3 - AGRIC 104 Introduction to Plant Sciences
4 - BIOL 104 General Biology II
4 - CH 102 General Chemistry
3 - ENGL 102 Composition II
3 - Mathematical Sciences Requirement[1]
17

Sophomore Year

First Semester
3 - AG M 205 Principles of Farm Shop
3 - AP EC 202 Agricultural Economics
4 - PHYS 207 General Physics I
3 - Computer Skills Requirement[2]
3 - Literature Requirement[3]
16

Second Semester
3 - ACCT 201 Financial Accounting Concepts
3 - AG M 206 Agricultural Mechanization
3 - AG M 303 Calculations for Mechanized Agric.
2 - E G 209 Intro. to Engr./Comp. Graphics
4 - PHYS 208 General Physics II
3 - Social Science Requirement[4]
18

Junior Year

First Semester
3 - AG M 301 Soil and Water Conservation
3 - AG M 406 Mechanical and Hydraulic Systems
3 - AP EC 302 Economics of Farm Management
3 - Minor[5]
3 - Social Science Requirement[4]
3 - Elective
18

Second Semester
3 - AP EC 309 Econ. of Agricultural Marketing
4 - CSENV 202 Soils
3 - SPCH 250 Public Speaking
3 - Humanities Requirement E.2[2]
3 - Writing Intensive Requirement[2]
16

Senior Year

First Semester
3 - AG M 402 Drainage, Irrig. and Waste Mgt.
3 - AG M 452 Farm Power
3 - AG M 460 Farm and Home Utilities
1 - AG M 472 Seminar
3 - AP EC 319 Agribusiness Management
3 - Minor[5]
16

Second Semester
1 - AG M 401 Environmental Control for Plants and Animals
2 - AG M 403 Structures for Plants and Animals
3 - AG M 408 Equipment Sales and Service
3 - Agriculture Requirement[6]
7 - Elective
16

135 Total Semester Hours

[1]A minimum of six credits selected from EX ST 301 or MTHSC 101; MTHSC 102; MTHSC 106.

[2]See General Education Requirements.

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]Select from ED F 302, GEOG 101, 301, 302, HIST 101, 102, 172, 173, PO SC 101, PSYCH 201, SOC 201, (R S) 401, or any AP EC and R S courses.

[5]Select from Agricultural Business Management minor list.

[6]See advisor.

ANIMAL AND VETERINARY SCIENCES

Bachelor of Science

The curriculum in Animal and Veterinary Sciences provides students with a broad base of understanding of scientific principles and the application of these principles to scientific, technical, and business phases of livestock and poultry production, processing, and marketing. Completion of general education requirements, basic sciences, applied sciences, and student-selected courses of personal interest prepares graduates well for successful careers. All students complete a common freshman year; the curriculum is then divided into five concentrations: Dairy Business, Equine Business, Food and Animal Business, Poultry Business, and Preveterinary and Science. Each concentration includes specialized courses unique to students pursuing careers in those fields.

Many opportunities are available to Animal and Veterinary Sciences graduates, including production, sales and marketing, business management, advertising, extension, meat and dairy industry, and teaching. Graduates in the Preveterinary and Science Concentration also meet all requirements for admission to graduate and professional schools including the veterinary medicine programs for the University of Georgia and Tuskegee University.

Freshman Year Program

First Semester
1 - AVS 100 Orientation to Animal, Dairy, and Veterinary Sciences
4 - AVS 202 Introductory Animal Sciences
4 - BIOL 103 General Biology I *or*
5 - BIOL 110 Principles of Biology I
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
16-17

Second Semester
1 - AVS 108 Animal and Dairy Sci. Techniques
4 - BIOL 104 General Biology II *or*
5 - BIOL 111 Principles of Biology II
4 - CH 102 General Chemistry
3 - ENGL 102 Composition II
3 - MTHSC 102 Intro. to Math. Analysis *or*
4 - MTHSC 106 Calculus of One Variable I
15-17

DAIRY BUSINESS CONCENTRATION

Sophomore Year

First Semester
3 - ACCT 201 Financial Accounting Concepts
1 - AVS 203 Dairy Science Techniques
4 - CSENV 202 Soils
4 - SPAN 101 Elementary Spanish
3 - Computer Skills Requirement[1]
3 - Humanities Requirement E.1[1]
18

Second Semester
3 - AP EC 202 Agricultural Economics
3 - AVS 310 Animal Disease and Sanitation
4 - SPAN 102 Elementary Spanish
3 - SPCH 250 Public Speaking
1 - Animal Techniques Requirement[2]
3 - Elective
17

Junior Year

First Semester
4 - AN PH 301 Physiology and Anatomy of Domestic Animals
3 - AP EC 302 Econ. of Farm Management
3 - AVS 370 Principles of Animal Nutrition
4 - AVS 404 Dairy Cattle Feeding and Mgt.[3]
4 - MICRO 305 General Microbiology
18

Second Semester
2 - AVS 302 Principles of Livestock Selection
3 - AVS 375 Applied Animal Nutrition
2 - AVS 461 Physiology of Lactation
3 - CSENV 423 Field Crop—Forages
1 - Animal Techniques Requirement[2]
3 - Business Requirement[4]
3 - Humanities Requirement E.2[1]
1 - Elective
18

Senior Year

First Semester
2 - AVS 406 Seminars and Related Topics
4 - AVS 430 Dairy Processing I
3 - EX ST 301 Introductory Statistics
4 - Animal Production Requirement[5]
3 - Writing Intensive Requirement[1]
16

Second Semester
3 - AVS 453 Animal Reproduction
3 - AVS 470 Animal Breeding
3 - Business Requirement[4]
7 - Elective[6]
16

134-137 Total Semester Hours

[1]See General Education Requirements.

[2]See advisor. Select from AVS 120, 204, 210.

[3]AVS 404 is taught in the fall semester of even-numbered years and may be taken in the senior year. See advisor for scheduling alternatives.

[4]See advisor. Select from AG M 205, 401, 402, 403, 460, AGRIC (EN SP) 315, AP EC 309, 319, 351, 409, 433, 460, CSENV (B E) 408, ECON 211, 212, EN SP 432, LAW 312, 313, MGT 301, 307.

[5]See advisor. Select from AVS 401, 402, 408, 412, 431. May be taken either first or second semester of senior year.

[6]Electives may be taken in the first semester of the senior year if necessary.

EQUINE BUSINESS CONCENTRATION

Sophomore Year

First Semester
3 - ACCT 201 Financial Accounting Concepts
3 - AP EC 202 Agricultural Economics
1 - AVS 204 Horse Care Techniques
4 - SPAN 101 Elementary Spanish
3 - Humanities Requirement E.1[1]
3 - Computer Skills Requirement[1]
17

Second Semester
3 - AGRIC 104 Intro. to Plant Sciences *or*
4 - CSENV 202 Soils
2 - AVS 205 Light Horse Management
3 - AVS 310 Animal Disease and Sanitation
4 - SPAN 102 Elementary Spanish
1 - Animal Techniques Requirement[2]
3 - Humanities Requirement E.2[1]
1 - Elective
17-18

Junior Year

First Semester
4 - AN PH 301 Physiology and Anatomy of Domestic Animals
3 - AP EC 302 Econ. of Farm Management
3 - AVS 370 Principles of Animal Nutrition
3 - EX ST 301 Introductory Statistics
1 - Animal Techniques Requirement[2]
3 - Elective
17

Second Semester
2 - AVS 302 Principles of Livestock Selection
2 - AVS 309 Principles of Equine Evaluation
3 - AVS 375 Applied Animal Nutrition
2 - AVS 385 Equine Behavior and Training
3 - AVS 453 Animal Reproduction
3 - CSENV 423 Field Crop—Forages
3 - SPCH 250 Public Speaking
18

Senior Year

First Semester
2 - AVS 406 Seminars and Related Topics
3 - AVS 407 Equine Theriogenology
4 - Animal Production Requirement[3]
3 - Business Requirement[4]
3 - Writing Intensive Requirement[1]
2 - Elective
17

Second Semester
4 - AVS 412 Horse Production
3 - AVS 470 Animal Breeding
3 - MGT 307 Personnel Management
3 - Business Requirement[4]
4 - Elective[5]
17

134-138 Total Semester Hours

[1]See General Education Requirements.

[2]See advisor. Select from AVS 120, 203, 210.

[3]See advisor. Select from AVS 401, 402, 404, 408.

[4]See advisor. Select from AG M 205, 401, 402, 403, 460, AGRIC (EN SP) 315, AP EC 309, 319, 351, 409, 433, 460, CSENV (B E) 408, ECON 211, 212, EN SP 432, LAW 312, 313, MGT 301.

[5]Electives may be taken in the first semester of the senior year if necessary.

FOOD ANIMAL BUSINESS CONCENTRATION

Sophomore Year

First Semester
3 - ACCT 201 Financial Accounting Concepts
3 - AP EC 202 Agricultural Economics
1 - AVS 210 Animal Science Techniques
4 - SPAN 101 Elementary Spanish
3 - Computer Skills Requirement[1]
3 - Humanities Requirement E.1[1]
17

Second Semester
3 - AVS 310 Animal Disease and Sanitation
4 - CSENV 202 Soils
3 - EX ST 301 Introductory Statistics
4 - SPAN 102 Elementary Spanish
1 - Animal Techniques Requirement[2]
3 - Elective[3]
18

Junior Year

First Semester
4 - AN PH 301 Physiology and Anatomy of Domestic Animals
3 - AP EC 302 Econ. of Farm Management
3 - AVS 370 Principles of Animal Nutrition
3 - SPCH 250 Public Speaking
1 - Animal Techniques Requirement[2]
3 - Elective[3]
17

Second Semester
2 - AVS 302 Principles of Livestock Selection
2 - AVS 353 Meats
1 - AVS 354 Meats Laboratory
3 - AVS 375 Applied Animal Nutrition
3 - AVS 453 Animal Reproduction
3 - Writing Intensive Requirement[1]
3 - Elective[3]
17

Senior Year

First Semester
2 - AVS 406 Seminars and Related Topics
4 - Animal Production Requirement[4]
6 - Business Requirement[5]
3 - Humanities Requirement E.2[1]
3 - Elective[3]
18

Second Semester
3 - AVS 470 Animal Breeding
3 - MGT 307 Personnel Management
4 - Animal Production Requirement[4]
3 - Business Requirement[5]
3 - Elective[3,6]
16

134-137 Total Semester Hours

[1]See General Education Requirements.

[2]See advisor. Select from AVS 120, 203, 204.

[3]Students opting to use elective hours to pursue a minor should inform their advisors early in their academic careers.

[4]See advisor. Select from AVS 401 or 408; and 402, 404, or 412.

[5]See advisor. Select from AG M 205, 401, 402, 403, 460, AGRIC (EN SP) 315, AP EC 309, 319, 351, 409, 433, 460, CSENV (B E) 408, 423, ECON 211, 212, EN SP 432, LAW 312, 313, MGT 301.

[6]Electives may be taken in the first semester of the senior year if necessary.

POULTRY BUSINESS CONCENTRATION

Sophomore Year

First Semester
3 - ACCT 201 Financial Accounting Concepts
3 - AP EC 202 Agricultural Economics
1 - AVS 120 Poultry Techniques
4 - SPAN 101 Elementary Spanish
3 - Computer Skills Requirement[1]
3 - Humanities Requirement E.1[1]
17

Second Semester
3 - AVS 310 Animal Disease and Sanitation
2 - AVS 323 Poultry and Poultry Products Eval.
3 - EX ST 301 Introductory Statistics
4 - SPAN 102 Elementary Spanish
1 - Animal Techniques Requirement[2]
3 - Humanities Requirement E.2[1]
1 - Elective
17

Junior Year

First Semester

4 - AN PH 301 Physiology and Anatomy of Domestic Animals
3 - AP EC 302 Econ. of Farm Management
3 - AVS 370 Principles of Animal Nutrition
2 - AVS 400 Avian Physiology[3]
3 - SPCH 250 Public Speaking
3 - Business Requirement[4]
18

Second Semester

2 - AVS 302 Principles of Livestock Selection
3 - AVS 355 Poul. Products Grading and Tech.[5]
3 - AVS 375 Applied Animal Nutrition
3 - AVS 453 Animal Reproduction
1 - Animal Techniques Requirement[2]
3 - Business Requirement[4]
3 - Elective
18

Senior Year

First Semester

2 - AVS 406 Seminars and Related Topics
3 - AVS 458 Avian Microbiol. and Parasitology
4 - Animal Production Requirement[6]
3 - Business Requirement[4]
3 - Writing Intensive Requirement[1]
1 - Elective
16

Second Semester

4 - AVS 402 Poultry Management
3 - MGT 307 Personnel Management
3 - Business Requirement[4]
7 - Elective[7]
17

134-137 Total Semester Hours

[1]See General Education Requirements.

[2]See advisor. Select from AVS 203, 204, 210.

[3]AVS 400 is taught in the fall semester of even-numbered years and may be taken in the senior year. See advisor for scheduling alternatives.

[4]See advisor. Select from AG M 205, 401, 402, 403, 460, AGRIC (EN SP) 315, AP EC 309, 319, 351, 409, 433, 460, CSENV (B E) 408, ECON 211, 212, EN SP 432, LAW 312, 313, MGT 301.

[5]AVS 355 is taught in alternate years and may be taken in the senior year. See advisor for scheduling alternatives.

[6]Select from AVS 401, 404, 408, 412. Some courses are taught on an alternate semester/year cycle. See advisor for scheduling alternatives.

[7]Electives may be taken in the first semester of the senior year if necessary.

PREVETERINARY AND SCIENCE CONCENTRATION

Sophomore Year

First Semester

3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
4 - PHYS 207 General Physics I
1 - Animal Techniques Requirement[1]
6 - Humanities Requirement E.1 and E.2[2]
3 - Elective[3]
18

Second Semester

3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
3 - EX ST 301 Introductory Statistics
4 - PHYS 208 General Physics II
3 - Computer Skills Requirement[2]
3 - Social Science Requirement[2]
17

Junior Year

First Semester

4 - AN PH 301 Physiology and Anatomy of Domestic Animals
3 - AP EC 202 Agricultural Economics
3 - AVS 370 Principles of Animal Nutrition
3 - BIOCH 301 General Biochemistry
4 - GEN 302 Introductory Genetics
1 - Animal Techniques Requirement[1]
18

Second Semester

3 - AVS 310 Animal Disease and Sanitation
3 - AVS 375 Applied Animal Nutrition
3 - AVS 453 Animal Reproduction
4 - MICRO 305 General Microbiology
3 - SPCH 250 Public Speaking
1 - Animal Techniques Requirement[1]
17

Senior Year

First Semester

2 - AVS 406 Seminars and Related Topics
4 - Animal Production Requirement[4]
3-4 - Animal Products Requirement[5]
8 - Elective[3]
17-18

Second Semester

3 - AVS 470 Animal Breeding
3 - Writing Intensive Requirement[2]
10 - Elective[3, 6]
16

134-138 Total Semester Hours

[1]See advisor. Select from AVS 120, 203, 204, 210.

[2]See General Education Requirements.

[3]Students opting to use elective hours to pursue a minor should inform their advisors early in their academic careers.

[4]Select from AVS 401, 402, 404, 408, 412. Some courses are taught on an alternate semester/year cycle. See advisor for scheduling alternatives. Tuskegee University Veterinary School requires three credits of poultry science.

[5]See advisor. Select from AVS 353/354, 355, 430. Some courses are taught on an alternate semester/year cycle. See advisor for scheduling alternatives.

[6]Electives may be taken in the first semester of the senior year if necessary.

AQUACULTURE, FISHERIES, AND WILDLIFE BIOLOGY

Bachelor of Science

Increased interest in conservation of natural resources and the environment and demand for seafood products and farm-raised fish have resulted in these areas becoming increasingly technical and requiring highly qualified wildlife and fisheries biologists. Greatest demands for graduates are in the areas of management, research, survey, and regulatory positions with state and federal agencies; industrial research and quality control laboratories; conservation, recreational, and other public service agencies; and private enterprises and fish farms.

The undergraduate curriculum provides a solid foundation for many careers in the sciences. The curriculum is strong in basic and applied sciences, communication skills, and the social sciences. In addition, six credit hours are available for field training with appropriate natural resource agencies. Students can satisfy coursework requirements for professional certification by the Wildlife Society and/or the American Fisheries Society.

Freshman Year

First Semester

4 - BIOL 103 General Biology I
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
1 - W F B 101 Intro. to Aquaculture, Fisheries, and Wildlife
3 - Mathematical Sciences Requirement[1]
1 - Elective
16

Second Semester

4 - BIOL 104 General Biology II
4 - CH 102 General Chemistry
3 - ENGL 102 Composition II
1 - W F B 102 Methods of Aquaculture, Fisheries, and Wildlife Biology
3 - Mathematical Sciences Requirement[1]
1 - Elective
16

Sophomore Year

First Semester

4 - CSENV 202 Soils
3 - W F B 300 Wildlife Biology
3 - Bioscience Requirement[2]
3 - Social Science Requirement[1]
3 - Elective
16

Second Semester

3 - W F B 350 Prin. of Fish and Wildlife Biology
3 - Bioscience Requirement[2]
3 - Computer Skills Requirement[1]
3 - Humanities Requirement E.1[1]
3 - Social Science Requirement[1]
15

Junior Year

First Semester

4 - AN PH 301 Physiology and Anatomy of Domestic Animals
3 - ENGL 314 Technical Writing
4 - Approved Requirement[3]
3 - Humanities Requirement E.2[1]
3 - Wildlife Requirement[4]
17

Second Semester

3 - EX ST 301 Introductory Statistics
4 - GEN 302 Introductory Genetics
3 - W F B 313 Conservation Biology
4 - Approved Requirement[3]
3 - Fisheries Requirement[5]
17

Senior Year

First Semester
3 - W F B 430 Wildlife Conservation Policy
4 - Approved Requirement[3]
3 - Botany Requirement[6]
3 - Ecology Requirement[7]
3 - Fisheries Requirement[5]
16

Second Semester
3 - SPCH 250 Public Speaking
1 - W F B 499 Wildlife Biology and Fisheries Seminar
3 - Approved Requirement[3]
3 - Wildlife Requirement[4]
6 - Elective
16

129 Total Semester Hours

[1]See General Education Requirements. (EX ST 301 may not be used to satisfy the Mathematical Sciences Requirement.)

[2]Three credits from BIOSC 302 or 303, and three credits from 304 or 305.

[3]Fifteen credits from AG M 301, AP EC 257, 475, C R D 357 or any course in BIOL, BIOSC, EN SP, ENT, ENTOX, FOR, GEOL, MICRO, W F B. Other courses approved by advisor.

[4]Six credits from W F B 412, 414, 440, 462 or 493 (with advisor's approval).

[5]Six credits from W F B 416, 418, 450, or 493 (with advisor's approval).

[6]At least three credits from BIOSC 320, 406/407, FOR 205.

[7]Select from BIOSC 441, 443, 446, FOR 315.

BIOCHEMISTRY

Bachelor of Science

Biochemistry is the study of the molecular basis of life. To comprehend current biochemical information and make future contributions to our molecular understanding of life processes, students must obtain a broad background in biology and a firm foundation in chemistry, mathematics, and physics. This is the basis of the biochemistry curriculum.

The program provides an excellent educational background for professional school (medicine, dentistry, or veterinary medicine) and graduate school in biochemistry, molecular biology, or another biological science discipline. Graduates will find employment opportunities in the research and service programs of universities, medical schools, hospitals, research institutes, and industrial and government laboratories.

Freshman Year

First Semester
5 - BIOL 110 Principles of Biology I
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
4 - MTHSC 106 Calculus of One Variable I
16

Second Semester
5 - BIOL 111 Principles of Biology II
4 - CH 102 General Chemistry
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
16

Sophomore Year

First Semester
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.[1]
4 - MICRO 305 General Microbiology
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 122 Physics with Calculus I
1 - PHYS 124 Physics Lab. I
16

Second Semester
3 - BIOCH 301 General Biochemistry
3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.[1]
3 - PHYS 221 Physics with Calculus II
1 - PHYS 223 Physics Lab. II
3 - Literature Requirement[2]
3 - Social Science Requirement[3]
17

Junior Year

First Semester
3 - BIOCH 431 Physical Approach to Biochem.
2 - BIOCH 433 General Biochemistry Lab. I
3 - CH 330 Introduction to Physical Chemistry[4]
3 - CP SC 120 Intro. to Information Technology
3 - Science Requirement[5]
3 - Elective
17

Second Semester
3 - BIOCH 432 Biochemistry of Metabolism
2 - BIOCH 434 General Biochemistry Lab. II
2 - BIOCH 436 Nucleic Acid and Protein Biosyn.
3 - Literature Requirement[2]
4 - Science Requirement[5]
3 - Social Science Requirement[3]
17

Senior Year

First Semester
3 - BIOCH 491 Special Problems in Biochemistry
3 - CH 313 Quantitative Analysis
1 - CH 317 Quantitative Analysis Lab.
3 - SPCH 250 Public Speaking
3 - Approved Requirement[6]
3 - Elective
16

Second Semester
2 - BIOSC 493 Senior Seminar
3 - ENGL 314 Technical Writing
6 - Approved Requirement[6]
4 - Elective
15

130 Total Semester Hours

[1]CH 225 may substitute for CH 227, and CH 226 may substitute for CH 228. In both cases, the additional hour of credit counts toward a science requirement.

[2]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[3]See General Education Requirements.

[4]CH 331 may be substituted.

[5]Select from courses in BIOSC, CH, CP SC, GEN, MTHSC, MICRO, PHYS, PL PA, or as approved by advisor in consultation with the biochemistry faculty.

[6]A one-year sequence in a foreign language (strongly recommended) or any humanities or social science courses listed in section E.2 or F of the General Education Requirements.

BIOLOGICAL SCIENCES

Bachelor of Science

Biology encompasses the broad spectrum of the modern life sciences, including the study of all aspects of life from the structure and function of the whole organism down to the subcellular levels and up through the interactions of organisms to the integrated existence of life on the entire planet. Descriptive, structural, functional, and evolutionary questions are explored through the hierarchy of the organization of life. Applications of current advances to the health and well-being of man and society, to nature and the continuation of earth as a balanced ecosystem, and to an appreciation of the place of natural science in our cultural heritage receive emphasis.

Majors in Biological Sciences receive classroom, laboratory, and field training in biology with an emphasis on chemistry, mathematics, and physics as necessary tools. The Bachelor of Science in Biological Sciences curriculum prepares students for graduate study in any of the life science areas (such as agricultural sciences, biochemistry, botany, cell and molecular biology, conservation, ecology and environmental science, entomology, forestry, genetics, industrial and regulatory biology, microbiology, morphology, physiology, wildlife biology, and zoology, for the health professions (medicine, dentistry, etc.), veterinary medicine, and for science teaching.

Freshman Year

First Semester
5 - BIOL 110 Principles of Biology I[1]
1 - BIOSC 101 Frontiers in Biology I[2]
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
4 - MTHSC 106 Calculus of One Variable I
17

Second Semester
5 - BIOL 111 Principles of Biology II[1]
1 - BIOSC 102 Frontiers in Biology II[2]
4 - CH 102 General Chemistry
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
17

Sophomore Year

First Semester
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
3 - CP SC 120 Intro. to Information Technology
4 - GEN 302 Introductory Genetics
3 - Literature Requirement[3]
3 - Elective
17

Second Semester
3 - BIOCH 301 General Biochemistry
1 - BIOCH 302 Molecular Biology Lab.[4]
3 - BIOSC 335 Evolutionary Biology
3 - CH 224 Organic Chemistry
3 - PHIL 325 Philosophy of Science *or*
3 - PHIL 326 Science and Values
3 - Social Science Requirement[5]
16

Junior Year

First Semester
3 - ENGL 314 Technical Writing
4 - PHYS 207 General Physics I *or*
    3 - PHYS 122 Physics with Calculus I *and*
    1 - PHYS 124 Physics Lab. I[6]
7 - Major[7]
3 - Social Science Requirement[5]
17

Second Semester
4 - PHYS 208 General Physics II *or*
    3 - PHYS 221 Physics with Calculus II *and*
    1 - PHYS 223 Physics Lab. II
3 - SPCH 250 Public Speaking
7 - Major[7]
3 - Elective
17

Senior Year

First Semester
2 - BIOSC 493 Senior Seminar
12 - Major[7]
3 - Elective
17

Second Semester
11 - Major[7]
6 - Elective
17

135 Total Semester Hours

[1]BIOL 110 and 111 are strongly recommended; however, BIOL 103 may substitute for BIOL 110, and BIOL 104 may substitute for BIOL 111. The remaining 1–2 hours required must be satisfied by completing 1–2 extra hours in major courses.

[2]If not completed in the freshman year, required 1–2 credits must be satisfied by completing 1–2 extra hours in major courses.

[3]Select from sophomore literature courses (200-level only) or foreign language literature (300-level or higher).

[4]CH 228 may be substituted for BIOCH 302.

[5]See General Education Requirements.

[6]Physics with calculus is a three-semester sequence. Students selecting this option may wish to take PHYS 222/224 in the senior year to complete the sequence.

[7]See advisor. At least one lecture course must be taken from each of the following areas: Ecology, Cell Biology, Physiology, Animal Diversity, Plant Diversity. Labs must be included with the Animal or Plant Diversity courses selected. Six additional credits of lab are required and must include a lab from each of two of the three remaining core areas: Ecology, Cell Biology, and Physiology to match the major core lecture course taken. The remaining courses may be selected from departmental course offerings at the 300 level or above.

BIOLOGICAL SCIENCES

Bachelor of Arts

The Bachelor of Arts in Biological Sciences provides a strong foundation in biology and is ideal for students desiring a liberal education emphasizing an interdisciplinary approach to a thorough understanding of the life sciences.

Freshman Year

First Semester
5 - BIOL 110 Principles of Biology I[1]
1 - BIOSC 101 Frontiers in Biology I[2]
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
4 - Foreign Language Requirement[3]
17

Second Semester
5 - BIOL 111 Principles of Biology II[1]
1 - BIOSC 102 Frontiers in Biology II[2]
4 - CH 102 General Chemistry
3 - ENGL 102 Composition II
4 - Foreign Language Requirement[3]
17

Sophomore Year

First Semester
4 - GEN 302 Introductory Genetics
3 - HIST 172 Western Civilization
4 - MTHSC 106 Calculus of One Variable I
3 - Foreign Language Requirement[3]
3 - Literature Requirement[4]
17

Second Semester
3 - BIOSC 335 Evolutionary Biology
3 - CP SC 120 Intro. to Information Technology
4 - MTHSC 108 Calculus of One Variable II *or*
    3 - MTHSC 301 Stat. Theory and Meth. I
3 - Foreign Language Requirement[3]
3 - Literature Requirement[4]
16-15

Junior Year

First Semester
3 - BIOCH 210 Elementary Biochemistry
1 - BIOCH 211 Elementary Biochemistry Lab.
3 - ENGL 314 Technical Writing
4 - PHYS 207 General Physics I
4 - Major[5]
3 - Minor[6]
18

Second Semester
3 - HIST 173 Western Civilization
3 - PHIL 325 Philosophy of Science *or*
    3 - PHIL 326 Science and Values
4 - PHYS 208 General Physics II
3 - SPCH 250 Public Speaking
4 - Major[5]
17

Senior Year

First Semester
2 - BIOSC 493 Senior Seminar
3 - Major[5]
6 - Minor[6]
5-6 - Elective
16-17

Second Semester
6 - Major[5]
6 - Minor[6]
4 - Elective
16

134 Total Semester Hours

[1]BIOL 110 and 111 are strongly recommended; however, BIOL 103 may substitute for BIOL 110, and BIOL 104 may substitute for BIOL 111. The remaining 1–2 hours required must be satisfied by completing 1–2 extra hours in major courses.

[2]If not completed in the freshman year, required 1–2 credits must be satisfied by completing 1–2 extra credits in major courses.

[3]Four semesters of the same language are required.

[4]Select from sophomore literature courses (200-level only) or foreign language literature (300-level or higher).

[5]At least one lecture course must be taken from each of the following areas: Ecology, Cell Biology, Physiology, Animal Diversity, and Plant Diversity. Laboratories must be taken with the Animal and Plant Diversity courses selected.

[6]See advisor.

BIOSYSTEMS ENGINEERING

Bachelor of Science

The Biosystems Engineering program is administered jointly by the College of Agriculture, Forestry, and Life Sciences and the College of Engineering and Science. See page 67 for the curriculum.

FOOD SCIENCE

Bachelor of Science

Food Science majors apply principles of basic and applied sciences to the production, processing, evaluation, packaging, distribution, and utilization of safe, nutritious, and enjoyable foods and food products. The safety of foods during processing and preservation, the provision of foods with adequate nutritional value, adherence to dietary recommendations, and the conservation of resources are important consumer issues addressed by food scientists.

The curriculum allows flexibility for concentrating in one of two areas. In the Food Science and Technology concentration, students may emphasize business, engineering, food packaging, additional sciences, or other areas that complement requirements of the Institute of Food Technologists. The Nutrition and Dietetics concentration emphasizes nutrition and related areas. The Nutrition and Dietetics concentration is currently granted approval status by the Commission on Accreditation for Dietetics Education of the American Dietetic Association, 216 West Jackson Blvd., Chicago, IL 60606-6995.

Food processing industries, ingredient manufacturers, and packaging suppliers employ graduates in food product development, quality assurance, production, management, and business and technical sales. State and federal agencies also need graduates for food safety and regulatory positions. With the Nutrition and Dietetics concentration, employment opportunities include dietitians, nutritionists, consultants, and food specialists. Graduates in Food Science are also well prepared to pursue graduate study in many areas.

Freshman Year

First Semester
4 - BIOL 103 General Biology I *or*
    5 - BIOL 110 Principles of Biology I
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
1 - FD SC 101 Epochs in Man's Struggle for Food
4 - Mathematical Sciences Requirement[1]
16-17

Second Semester
4 - BIOL 104 General Biology II *or*
    5 - BIOL 111 Principles of Biology II
4 - CH 102 General Chemistry
3 - CP SC 120 Intro. to Information Technology
3 - ENGL 102 Composition II
2 - FD SC 102 Perspectives in Food and Nutr. Sci.
16-17

Sophomore Year

First Semester
3 - BIOCH 210 Elementary Biochemistry
1 - BIOCH 211 Elementary Biochemistry Lab.
4 - CH 201 Survey of Organic Chemistry *or*
3 - CH 223 Organic Chemistry *and*
1 - CH 227 Organic Chemistry Lab.
4 - PHYS 200 Introductory Physics *or*
3 - PHYS 122 Physics with Calculus I *or*
4 - PHYS 207 General Physics I
3 - Social Science Requirement[2]
2 - Elective
16-17

Second Semester
4 - FD SC 214 Food Resources and Preservation
3 - Humanities Requirement E.1[2]
3 - Oral Communication Requirement[3]
3 - Social Science Requirement[2]
3 - Elective
16

FOOD SCIENCE AND TECHNOLOGY CONCENTRATION

Junior Year

First Semester
3 - FD SC 404 Food Preservation and Processing
1 - FD SC 406 Food Preservation and Proc. Lab. I
4 - MICRO 305 General Microbiology
3 - NUTR 451 Human Nutrition
3 - Emphasis Area[4]
3 - Elective
17

Second Semester
3 - EX ST 301 Introductory Statistics
4 - FD SC 408 Food Process Engineering
4 - MICRO 407 Food and Dairy Microbiology
3 - Writing Intensive Requirement[2]
2 - Elective
16

Senior Year

First Semester
4 - FD SC 401 Food Chemistry I
3 - FD SC 409 TQM for the Food and Pkg. Ind.
1 - FD SC 417 Seminar
5 - Emphasis Area[4]
2 - Elective
15

Second Semester
4 - FD SC 402 Food Chemistry II
1 - FD SC 418 Seminar
4 - Department Requirement[5]
4 - Emphasis Area[4]
3 - Humanities Requirement E.2[2]
16

128-131 Total Semester Hours

NUTRITION AND DIETETICS CONCENTRATION

Junior Year

First Semester
4 - BIOSC 222 Human Anatomy and Phys. I
3 - FD SC 306 Food Service Operations
3 - FD SC 404 Food Preservation and Processing
2 - FD SC 407 Quantity Food Production
3 - NUTR 451 Human Nutrition
3 - Humanities Requirement E.2[2]
18

Second Semester
4 - BIOSC 223 Human Anatomy and Phys. II
3 - EX ST 301 Introductory Statistics
3 - NUTR 455 Nutrition and Metabolism
3 - Writing Intensive Requirement[2]
3 - Elective
16

Senior Year

First Semester
4 - FD SC 401 Food Chemistry I
3 - FD SC 409 TQM for the Food and Pkg. Ind.
4 - MICRO 305 General Microbiology
4 - NUTR 425 Nutrition and Dietetics
3 - Registration Eligibility Requirement[6]
18

Second Semester
4 - FD SC 402 Food Chemistry II
4 - MICRO 407 Food and Dairy Microbiology
3 - NUTR 426 Community Nutrition
3 - Registration Eligibility Requirement[6]
2 - Elective
16

132-135 Total Semester Hours

[1]MTHSC 106 or equivalent.
[2]See General Education Requirements.
[3]SPCH 250 or equivalent.
[4]See advisor.
[5]Select from FD SC 421, 491, PKGSC 464, 466.
[6]See advisor for courses to meet additional competencies of the American Dietetic Association; students not pursuing registration eligibility will have slightly different course options.

FOREST RESOURCE MANAGEMENT

Bachelor of Science

The Forest Resource Management curriculum combines a broad education in the arts and sciences with applied forest sciences. This combination provides the necessary foundation for the scientific management of forest resources, products, and services.

Foresters are qualified for a broad spectrum of employment opportunities in the public and private sectors. They may be engaged as managers, administrators, or owners of forest lands or forest-based businesses; as technical specialists in the production of timber, useable water, wildlife, and aesthetic values, and in the recreational use of the forest; or as professionals in other areas where the conservation of natural resources is a concern. Foresters earning advanced degrees find employment in academic work and in research conducted by public and private agencies.

The curriculum, accredited by the Society of American Foresters, provides a strong program in the basic knowledge and skills required of a professional forester. Forest Resource Management majors will select a minor. (See page 46.) The curriculum also provides the necessary prerequisites for graduate study. The Department of Forestry offers graduate programs leading to the Master of Science, Master of Forest Resources, and Doctor of Philosophy degrees.

Freshman Year

First Semester
4 - BIOL 103 General Biology I
4 - CH 105 Beg. General and Organic Chemistry[1]
3 - ENGL 101 Composition I
1 - FOR 101 Introduction to Forestry
3 - MTHSC 102 Intro. to Mathematical Analysis
15

Second Semester
4 - BIOL 104 General Biology II[2]
3 - CP SC 120 Intro. to Information Technology
3 - ENGL 102 Composition II
3 - FOR 221 Wood Properties I
3 - Elective
16

Sophomore Year

First Semester
4 - CSENV 202 Soils
3 - FOR 205 Dendrology
3 - Literature Requirement[3]
3 - Social Science Requirement[4]
3 - Elective
16

Second Semester
3 - FOR 206 Forestry Ecology
4 - PHYS 200 Introductory Physics
3 - SPCH 250 Public Speaking
3 - Economics Requirement[5]
3 - Humanities Requirement E.2[4]
16

Forestry Summer Camp

2 - FOR 251 Forest Communities
4 - FOR 253 Forest Mensuration
1 - FOR 254 Forest Products
7

Junior Year

First Semester
3 - EX ST 301 Introductory Statistics[6]
3 - FOR 302 Forest Biometrics
3 - FOR 304 Forest Resource Economics
4 - FOR 413 Integrated Forest Pest Management
3 - FOR 460 Silviculture I
3 - Minor[7]
19

Second Semester
3 - ENGL 314 Technical Writing
2 - FOR 308 Remote Sensing and GIS in Forestry
3 - FOR 418 Forest Resource Valuation
3 - FOR 462 Silviculture II
3 - Minor[7]
4 - Elective
18

Senior Year

First Semester
4 - FOR 314 Harvesting and Forestry Products
2 - FOR (E N R) 416 Forest Policy and Admin.
3 - FOR 417 Forest Res. Mgt. and Regulation
6 - Minor[7]
15

Second Semester
2 - FOR 406 Forest Watershed Management
3 - FOR 415 Forest Wildlife Management
2 - FOR 423 Current Issues in Natural Resources
2 - FOR 425 Forest Resource Management Plans
2 - FOR 431 Rec. Resource Plan. in Forest Mgt.
3 - Minor[7]
14

136 Total Semester Hours

[1]CH 101 may be substituted.
[2]Can be satisfied by CH 102 (if CH 101 is taken) or 106 (if CH 105 is taken).
[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.
[4]See General Education Requirements.
[5]Select ECON course from General Education Requirement F.
[6]MTHSC 203, 301, or equivalent may be substituted.
[7]To be selected by the end of the sophomore year.

HORTICULTURE

Bachelor of Science

Horticulture is the art, science, and business of food crops, ornamental plants, and turfgrasses and their production, utilization, and maintenance. A strong foundation in the basic sciences and humanities is built on courses in mathematics, chemistry, botany, physics, computer science, communications, economics, and humanities. Horticulture as a science depends on disciplines such as plant pathology, plant physiology, entomology, forestry, agronomy, soils, agricultural engineering, and agricultural economics. Business courses contribute to a well-rounded curriculum. A growing aspect of horticulture involves the management of enterprises, from production to distribution and marketing. Horticulture as an art involves the arrangement of plants in an aesthetically pleasing fashion, an exterior landscape for a residence or building or manicuring a golf green.

The Horticulture major broadly represents all crops and commodities. Though broad training is required of all Horticulture majors, students may tailor their courses around the traditional commodities by the appropriate selection of electives.

Students begin professional development as undergraduates. An internship in a horticultural enterprise is strongly recommended. Students considering graduate school are advised to take optional courses in the basic sciences as well as conduct an undergraduate research project. Those with strong interests in specific disciplines may complete special problems under the supervision of a faculty member.

Freshman Year

First Semester
4 - BIOL 103 General Biology I
3 - ENGL 101 Composition I
3 - HORT 101 Horticulture
3 - MTHSC 102 Intro. to Mathematical Analysis
3 - Computer Skills Requirement[1]
16

Second Semester
3 - BIOSC 205 Plant Form and Function
1 - BIOSC 206 Plant Form and Function Lab.
3 - ENGL 102 Composition II
3 - EX ST 301 Introductory Statistics *or*
    3 - MTHSC 101 Introduction to Probability
3 - Humanities Requirement E.2[1]
3 - Social Science Requirement[1]
16

Sophomore Year

First Semester
4 - CH 101 General Chemistry
3 - HORT 303 Plant Materials
3 - Business Requirement[2]
3 - Oral Communication Requirement[1]
3 - Social Science Requirement[1]
16

Second Semester
4 - CH 102 General Chemistry
3 - HORT 304 Annuals and Perennials
3 - HORT 305 Plant Propagation
1 - HORT 306 Plant Propagation Techniques Lab
3 - Humanities Requirement E. 1[1]
3 - Writing Intensive Requirement[1]
17

Junior Year

First Semester
4 - CSENV 202 Soils
3 - Business Requirement[2]
3 - Life Science Requirement[2]
3 - Physical Science Requirement[2]
3 - Plant Protection Requirement[2]
16

Second Semester
3 - BIOSC 401 Plant Physiology
1 - BIOSC 402 Plant Physiology Lab.
1 - HORT 409 Seminar
3 - Horticulture Specialization Requirement[2]
4 - Physical Science Requirement[2]
3 - Plant Protection Requirement[2]
15

Senior Year

First Semester
3 - Departmental Requirement[2]
6 - Horticulture Specialization Requirement[2]
3 - Life Science Reqirement[2]
4 - Elective
16

Second Semester
3 - Departmental Requirement[2]
6 - Horticulture Specialization Requirement[2]
6 - Elective
15

127 Total Semester Hours

[1]See General Education Requirements.
[2]See advisor. Select from approved departmental list. Thirty credit hours must be selected from business, life science, physical science, and plant protection with at least two courses from each category.

MICROBIOLOGY

Bachelor of Science

Microbiology deals with the study of bacteria, viruses, yeasts, filamentous fungi, protozoa, and unicellular algae. Microbiologists seek to describe these organisms in terms of their structures, functions, and processes of reproduction, growth, and death at both the cellular and molecular levels. They are also concerned with their ecology, particularly in regard to their pathological effects on man, and with their economic importance.

The Microbiology major provides a thorough training in the basic microbiological skills. Further, students receive instruction in mathematics, physics, chemistry, and biochemistry, all essential to the training of a modern microbiologist. Students can prepare for a variety of careers through a wide choice of electives. The Microbiology curriculum with Molecular Biology Concentration is recommended for students planning postgraduate programs. Microbiology graduates may enter graduate school in microbiology, biochemistry, bioengineering, or related disciplines; they may enter a medical or dental school or pursue a career in one of the many industries or public service departments dependent upon microbiology. Some of these are the fermentation and drug industries, medical and public health microbiology, various food industries, and agriculture.

Microbiology majors planning to apply for admission to a medical or dental school should inform their advisors immediately upon entering the program.

Freshman Year

First Semester
5 - BIOL 110 Principles of Biology I[1]
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
4 - MTHSC 106 Calculus of One Variable I
16

Second Semester
5 - BIOL 111 Principles of Biology II[1]
4 - CH 102 General Chemistry
3 - ENGL 102 Composition II
1 - MICRO 100 Microbes and Human Affairs
3-4 - Mathematical Sciences Requirement[2]
16-17

Sophomore Year

First Semester
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
3 - CP SC 120 Intro. to Information Technology
4 - MICRO 305 General Microbiology
3 - Literature Requirement[3]
3 - Social Science Requirement[4]
17

Second Semester
3 - BIOCH 301 General Biochemistry
3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
3 - Approved Requirement[5]
3 - Literature Requirement[3]
4-3 - Mathematical Sciences or Science Requirement[6]
17-16

Junior Year

First Semester
4 - MICRO 401 Advanced Bacteriology
3 - SPCH 250 Public Speaking
4-3 - Physics Requirement[7]
6-7 - Elective
17

Second Semester
4 - MICRO 412 Bacterial Physiology
4 - MICRO 415 Microbial Genetics
4 - Physics Requirement[7]
3 - Social Science Requirement[4]
3-4 - Elective
18-19

Senior Year

First Semester
3 - ENGL 314 Technical Writing
14-13 - Approved Requirement[5]
17-16

Second Semester
4 - MICRO 411 Pathogenic Bacteriology
12 - Approved Requirement[5]
16

134 Total Semester Hours

[1]BIOL 103 may substitute for BIOL 110, and BIOL 104 may substitute for BIOL 111; the remaining 1–2 hours required must be satisfied by completing 1–2 extra hours in either biological sciences or microbiology.

[2]Select from MTHSC 108, 301, or EX ST 301. MTHSC 108 is required for Microbiology—Molecular Biology majors.

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]See General Education Requirements.

[5]A minimum of 15 credits must be selected from AVS 458, BIOSC 403, 404, 425, 426, 456/457, MICRO 400, 403, 407, 410, 413, 414, 416, 417, 491 (six credits maximum with advisor's approval).

[6]Select from GEOL 101 or any science course at the sophomore level or above, excluding microbiology, with advisor's approval.

[7]Select from PHYS 207/208 or 122/221/223.

MOLECULAR BIOLOGY CONCENTRATION

See Microbiology curriculum for Freshman year.

Sophomore Year

First Semester
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
3 - CP SC 120 Intro. to Information Technology
4 - MICRO 305 General Microbiology
3 - Literature Requirement[1]
3 - Social Science Requirement[2]
17

Second Semester
3 - BIOCH 301 General Biochemistry
3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
3 - Literature Requirement[1]
3 - Microbiology Requirement[3]
3 - Social Science Requirement[2]
16

Junior Year

First Semester
3 - CH 313 Quantitative Analysis
1 - CH 317 Quantitative Analysis Lab.
4 - MICRO 401 Advanced Bacteriology
3 - MICRO 414 Basic Immunology
4-3 - Physics Requirement[4]
2-3 - Elective
17

Second Semester
4 - MICRO 412 Bacterial Physiology
3 - MICRO 417 Molecular Mechanisms of Carcinogenesis and Aging
3 - SPCH 250 Public Speaking
4 - Physics Requirement[4]
3 - Elective
17

Senior Year

First Semester
3 - BIOCH 423 Principles of Biochemistry
3 - ENGL 314 Technical Writing
4 - MICRO 415 Microbial Genetics
3 - MICRO 416 Introductory Virology
3 - Elective
16

Second Semester
3 - BIOCH 432 Biochemistry of Metabolism
4 - MICRO 411 Pathogenic Bacteriology
3 - MICRO 491 Special Problems in Microbiology
8 - Elective
18

134 Total Semester Hours

[1]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[2]See General Education Requirements.

[3]Select from AVS 458, BIOSC 403, 404, 425, 426, 456/457, MICRO 400, 403, 407, 410, 413.

[4]Select from PHYS 207/208 or 122/221/223.

PACKAGING SCIENCE

Bachelor of Science

The Bachelor of Science degree in Packaging Science prepares students for careers in industries producing and utilizing packages for all types of products. Packaging is an essential part of industrialized economies, protecting, preserving, and helping to market products. The field of packaging is highly competitive and highly innovative, requiring an ever-increasing number of professional positions.

Opportunities for employment include a wide variety of career paths such as manufacturing, marketing, sales, design, purchasing, quality assurance, and customer services. Most career opportunities are in positions requiring technical knowledge combined with marketing and management skills.

The core curriculum assures the graduate of having the skills and knowledge required by most entry-level packaging positions. Emphasis area choices allow students to select courses to improve career preparation for specific industry segments. The food packaging emphasis area prepares students for this technically challenging field; the general packaging emphasis area allows concentrations in other speciality areas, such as environmental science or graphic communications.

Students changing majors to Packaging Science must have at least a 2.0 cumulative grade-point ratio.

Freshman Year

First Semester
4 - BIOL 103 General Biology I
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
1 - PKGSC 101 Packaging Orientation[1]
3 - Mathematical Sciences Requirement[2]
15

Second Semester
4 - BIOL 104 General Biology II
4 - CH 102 General Chemistry
3 - ENGL 102 Composition II
4 - MTHSC 106 Calculus of One Variable I
2 - PKGSC 102 Intro. to Packaging Science[1]
1 - Elective
18

Sophomore Year

First Semester
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
3 - CP SC 120 Intro. to Information Technology
4 - PHYS 207 General Physics I[3]
3 - PKGSC 202 Packaging Materials and Manufacturing[1]
3 - THRD 180 Introduction to Technical Drawing and Computer Aided Drafting
17

Second Semester
4 - FD SC 214 Food Resources and Preservation
4 - G C 104 Graphic Communications I
3 - PKGSC 204 Container Systems[1]
1 - PKGSC 206 Container Systems Lab.
3 - Emphasis Area[2]
3 - Humanities Requirement E.1[4]
18

Summer

0 - CO-OP 101 Cooperative Education[5]

Junior Year

First Semester
3 - EX ST 301 Introductory Statistics
4 - MICRO 305 General Microbiology
3 - PKGSC 404 Mech. Properties of Packages and Principles of Package Evaluation
2 - PKGSC 454 Package Evaluation Lab.
3 - Social Science Requirement[6]
3 - Elective
18

Second Semester
3 - ENGL 314 Technical Writing
3 - PKGSC 316 Appl. of Polymers in Packaging
3 - SPCH 250 Public Speaking
5 - Emphasis Area[2]
3 - Social Science Requirement[6]
17

Senior Year

First Semester

3 - PKGSC 368 Packaging and Society
3 - PKGSC 420 Package Design and Dev.
4 - Emphasis Area[2]
3 - Humanities Requirement E.2[4]
3 - Elective

16

Second Semester

3 - PKGSC 401 Packaging Machinery
3 - PKGSC 440 Packaging for Distribution
3 - PKGSC 464 Food Packaging Systems
1 - PKGSC 466 Food Packaging Systems Lab.
3 - Emphasis Area[2]
3 - Elective

16

135 Total Semester Hours

[1]A C or better is required in this course for graduation

[2]See advisor.

[3]PHYS 122 and 124 may be substituted.

[4]See General Education Requirements.

[5]Students are required to complete at least one 15-week period (six months preferred) of Cooperative Education.

[6]AP EC 202 or ECON 211, and three credits selected from HIST 101, 102, 172, 173, PO SC 101, PSYCH 201, R S (SOC) 401; SOC 201, GEOG 101 or 103.

PREPROFESSIONAL HEALTH STUDIES

Non-degree

The health professions need individuals with a diversity of educational backgrounds and a wide variety of talents and interests. The philosophies of education, the specific preprofessional course requirements, the noncognitive qualifications for enrollment, and the systems of training vary among the professional health schools; but all recognize the desirability of a broad education—a good foundation in the natural sciences, highly developed communication skills, and a solid background in the humanities and social sciences. The absolute requirements for admission to professional health schools are limited to allow latitude for developing individualized undergraduate programs of study; however, most schools of medicine and dentistry require 16 semester hours of chemistry, including organic chemistry, eight hours of biological sciences, eight hours of physics, and at least one course in calculus. These requirements should be balanced with courses in vocabulary building, the humanities, and social sciences. The basic requirements in the natural sciences and as many of the courses in the humanities and social sciences as possible should be completed by the third year so that students will be prepared to take the Dental Admission Test or the Medical College Admission Test prior to applying to a professional school.

Undergraduates may also prepare to study optometry, podiatry, and other health professions. While the basic requirements for these professional schools are essentially the same as those for schools of medicine and dentistry, specific requirements for individual schools in these professions vary somewhat; consequently, interested students are advised to consult with the chief health professionals advisor.

At Clemson, rather than having a separate, organized preprofessional health study program, students are allowed to major in any curriculum, as long as the basic entrance requirements of the professional health school are fulfilled. These schools are not as concerned about a student's major as they are about academic performance whichever curriculum he or she chooses. Professional health schools have neither preferences nor prejudices concerning any curriculum, which is evidenced by the fact that their entering students represent a broad spectrum of curricula. The emphasis is placed on the student's doing well in the curriculum chosen, and this becomes critical as competition increases for the limited number of places available in professional health schools.

PREALLIED HEALTH

(See Prerehabilitation Sciences.)

PREOCCUPATIONAL THERAPY

(See Prerehabilitation Sciences.)

PREPHARMACY

Prepharmacy is a two-year program requiring a minimum of 68 semester hours. Upon completion of the curriculum, students will be eligible to apply to a college of pharmacy, usually the Medical University of South Carolina or the University of South Carolina. The degree in Pharmacy is awarded by the institution attended. It is important for students to work closely with their advisor as there are variations in courses required by the pharmacy schools.

For financial aid purposes, students in the Prepharmacy program are considered to be enrolled in a degree-seeking program.

First Year

First Semester

4 - BIOL 103 General Biology I
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
3 - MTHSC 101 Introduction to Probability[1] *or*
    3 - HIST 365 English Cultural History[2]
3 - PSYCH 201 Introduction to Psychology

17

Second Semester

4 - BIOL 104 General Biology II
4 - CH 102 General Chemistry
3 - ECON 200 Economic Concepts
3 - ENGL 102 Composition II
4 - MTHSC 106 Calculus of One Variable *I or*
    3 - MTHSC 102 Intro. to Math. Analysis

17-18

Second Year

First Semester

3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
4 - MICRO 305 General Microbiology *or*
    3-4 - Physiology Requirement[3]
4 - PHYS 207 General Physics I
3 - Fine Arts Requirement[4]
4 - Foreign Language Requirement *or*
    3 - Liberal Arts Requirement[5]

17-19

Second Semester

3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
3 - MTHSC 301 Stat. Theory and Methods I *or*
    3 - EX ST 301 Introductory Statistics
4 - PHYS 208 General Physics II
3 - SPCH 150 Intro. to Speech Communication
4 - Foreign Language Requirement *or*
    3 - Liberal Arts Requirement[5]

17-18

68-72 Total Semester Hours

[1]Chemistry requires proficiency in algebra; physics requires proficiency in trigonometry. Entering freshmen must present a satisfactory score on the Clemson Mathematics Placement Test or register in the first semester in MTHSC 103.

[2]The Medical University of South Carolina requires a math course. The University of South Carolina requires a history course. To be eligible for both professional schools, the course not taken this semester must be taken during a summer term.

[3]The Medical University of South Carolina requires MICRO 305. The University of South Carolina requires a physiology course. To be eligible for both professional schools, the course not taken this semester must be taken during a summer term.

[4]See advisor.

[5]The University of South Carolina requires credit for two semesters of a foreign language or exemption by examination. Students exempting the foreign language must take a liberal arts requirement. Either the foreign language or the liberal arts requirement meets the Medical University of South Carolina requirement.

PREPHYSICAL THERAPY

(See Prerehabilitation Sciences.)

PREPHYSICIAN ASSISTANT PROGRAM

(See Prerehabilitation Sciences.)

PREREHABILITATION SCIENCES

Prerehabilitation Sciences includes concentrations in physical therapy, occupational therapy, physician assistant, and allied health areas. This curriculum is designed to meet the requirements of the rehabilitation medicine programs at the Medical University of South Carolina and other professional schools. This program requires a minimum of 68–90 semester hours of undergraduate coursework depending on the concentration. In addition, students must apply to a professional school for acceptance into its program.

Because preparation of some of the concentrations requires three years, students are advised to select a major with similar requirements after consultation with the Prerehabilitation Sciences advisor. The following curriculum fulfills the general requirements for those fields, requiring only two years of prerequisites. The Prephysical Therapy and Preoccupational Therapy concentrations require an additional year of electives. These electives should be chosen after consultation with the advisor. Professional schools may change their requirements at any time, so it is imperative that students in this major stay in close contact with their advisor.

For financial aid purposes, students in the Prerehabilitation Sciences program are considered to be enrolled in a degree-seeking program.

First Year

First Semester
4 - BIOL 103 General Biology I
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
3 - PSYCH 201 Introduction to Psychology
3-4 - Mathematical Sciences Requirement[1]
17-18

Second Semester
4 - BIOL 104 General Biology II
4 - CH 102 General Chemistry
3 - ENGL 102 Composition II
3 - Humanities Requirement[2]
3 - Mathematical Sciences Requirement[1]
17

Second Year

First Semester
4 - BIOSC 222 Human Anatomy and Phys. I
4 - PHYS 207 General Physics I
3 - PSYCH 340 Lifespan Developmental Psych.
3 - Humanities Requirement[2]
3 - Literature Requirement[3]
17

Second Semester
4 - BIOSC 223 Human Anatomy and Phys. II
3 - CP SC 120 Intro. to Information Technology
3 - HIST 365 English Cultural History
4 - PHYS 208 General Physics II
3 - SPCH 150 Intro. to Speech Communication
17

Third Year[4]

68-90 Total Semester Hours

[1]See advisor. Two courses selected from MTHSC 102 or 106 and EX ST 301 or MTHSC 301. To register for MTHSC 102 or 106, entering students must present a satisfactory score on the Clemson Mathematics Placement Test or register in the first semester for MTHSC 103.

[2]See General Education Requirements.

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]Currently only the Prephysical Therapy and Preoccupational Therapy concentrations require a third year. Although any credit course may satisfy the requirements for the third year, students are advised to select courses in consultation with the advisor to satisfy General Education Requirements.

PREVETERINARY MEDICINE

Under a regional plan, the South Carolina Preveterinary Advisory Committee coordinates a program for South Carolina residents who are interested in pursuing careers in veterinary medicine. South Carolina residents attending any college or university may apply through the Veterinary Medical College Application Service (VMCAS) to the University of Georgia College of Veterinary Medicine. Currently the University of Georgia admits up to 17 students each year through arrangements with the Southern Regional Education Board. The State of South Carolina also has a contract with Tuskegee University to admit up to four South Carolina residents. Application must be made directly to Tuskegee University.

Minimum requirements for admission to a college of veterinary medicine generally include the satisfactory completion of prescribed courses in a well-rounded undergraduate degree program. Specific requirements for admission to the University of Georgia College of Veterinary Medicine include the following undergraduate courses: six credits of English, 14 credits of humanities and social studies, eight of physics, eight of general biology, eight credits of advanced biology, three credits of biochemistry and 16 credits of organic and inorganic chemistry. (Chemistry and physics courses must be at the premedical level; they may not be survey courses.)

To be in the best competitive position, applicants should complete courses in animal agriculture, genetics, nutrition, biochemistry, and advanced biology. Considerations for selection are character, scholastic achievement, personality, experience with large and small animals, general knowledge, and motivation. In the past, competition has been keen, and only those applicants who have shown exceptional ability have been admitted. Specific considerations may include a minimal grade-point average and completion of standardized tests such as the Graduate Record Examination and the Veterinary College Admission Test.

Since out-of-state students attending Clemson are ineligible to apply to the University of Georgia or Tuskegee University under the South Carolina quota, they should contact the college(s) of veterinary medicine to which they plan to apply. They may apply at the University of Georgia for at-large admission.

Veterinary schools accept students with a broad range of academic backgrounds; therefore, it is recommended that the beginning university student select any undergraduate major and simultaneously complete the courses required for veterinary school entrance and those required for completion of a BS or BA degree. For students selecting Animal and Veterinary Sciences or Biological Sciences at Clemson University, the basic curricula have been designed to accommodate Georgia's entrance requirements. For further information, contact the Department of Animal and Veterinary Sciences at (864) 656-3427.

TURFGRASS

Bachelor of Science

The Turfgrass program, for students interested in careers in the rapidly growing turfgrass industry, specifies courses in turfgrass management, pathology of turf and ornamental plants, agricultural mechanization, personnel management, soil fertility, soil microbiology, weed control, and park and recreation management. Graduates pursue careers in professional lawn care; maintenance of parks, athletic fields, and golf courses; production and sale of seed, sod, supplies, and equipment; or service as technicians for businesses or government agencies.

Freshman Year

First Semester
4 - BIOL 103 General Biology I
3 - ENGL 101 Composition I
3 - HORT 101 Horticulture
3 - MTHSC 102 Intro. to Mathematical Analysis
3 - Computer Skills Requirement[1]
16

Second Semester
3 - BIOSC 205 Plant Form and Function
1 - BIOSC 206 Plant Form and Function Lab.
3 - ENGL 102 Composition II
3 - EX ST 301 Introductory Statistics *or*
3 - MTHSC 101 Introduction to Probability
3 - Humanities Requirement E.2[1]
3 - Social Science Requirement[1]
16

Sophomore Year

First Semester
4 - CH 101 General Chemistry
3 - HORT 303 Plant Materials
3 - Business Requirement[2]
3 - Oral Communication Requirement[1]
3 - Social Science Requirement[1]
16

Second Semester
4 - CH 102 General Chemistry
3 - HORT 212 Introduction to Turfgrass Culture
3 - Business Requirement[2]
3 - Humanities Requirement E.1[1]
3 - Writing Intensive Requirement[1]
16

Junior Year

First Semester
4 - CSENV 202 Soils
3 - Life Science Requirement[2]
3 - Physical Science Requirement[2]
3 - Plant Protection Requirement[2]
4 - Elective
17

Second Semester
3 - BIOSC 401 Plant Physiology
1 - BIOSC 402 Plant Physiology Lab.
1 - HORT 409 Seminar
3 - Horticulture Specialization Requirement[2]
4 - Physical Science Requirement[2]
3 - Plant Protection Requirement[2]
15

Senior Year

First Semester
3 - HORT 412 Turfgrass Management
3 - Departmental Requirement[2]
3 - Horticulture Specialization Requirement[2]
4 - Life Science Requirement[2]
3 - Soils Requirement[2]
16

Second Semester
3 - Departmental Requirement[2]
3 - Horticulture Specialization Requirement[2]
3 - Soils Requirement[2]
6 - Elective
15

127 Total Semester Hours

[1]See General Education Requirements.

[2]See advisor.

MINORS

Following are minors acceptable for students in the College of Agriculture, Forestry, and Life Sciences. Students cannot major and minor in the same field or acquire a minor that is not allowed by the degree program.

Accounting
Adult/Extension Education
Aerospace Studies
African American Studies
Agricultural Business Management
Agricultural Mechanization and Business
Anthropology
Aquaculture, Fisheries, and Wildlife Biology
Beef Cattle Production—*not open to Animal and Veterinary Sciences majors*
Biochemistry
Bioengineering
Biological Sciences
Business Administration
Chemistry
Cluster
Communications
Computer Science
Crop and Soil Environmental Science
Early Intervention Specialist
Economics
Elementary Education
English
Entomology
Entrepreneurship
Environmental Engineering
Environmental Science and Policy
Film Studies
Financial Management
Fine Arts
Food Science
Forest Products
Forest Resource Management
Geography
Geology
Great Works
Health Science
History
Horse Production—*not open to Animal and Veterinary Sciences majors*
Horticulture—*not open to Turfgrass majors*
Human Resource Management
International Politics
Legal Studies
Management
Marketing
Mathematical Sciences
Microbiology
Military Science
Modern Languages
Music
Natural Resource Economics
Operations Management
Packaging Science
Parks, Recreation, and Tourism Management
Philosophy
Physics
Political Science
Poultry Science—*not open to Animal and Veterinary Sciences majors*
Psychology
Public Policy
Religion
Science and Technology in Society
Screenwriting
Secondary Education
Sociology
Spanish-American Area Studies
Speech and Communication Studies
Textiles
Theatre
Urban Forestry
Women's Studies
Writing

See pages 30–33 for details.

COLLEGE OF ARCHITECTURE, ARTS, AND HUMANITIES

The collaboration of Architecture (Landscape Architecture, Construction Science and Management, City and Regional Planning, and Architecture) with Arts (Visual Arts and Performing Arts) and the Humanities (English, History, Languages, Philosophy and Religion, and Speech and Communication Studies) produces a remarkably rich environment for study. The mixture of core disciplines with applied professsions/disciplines in the College provides both depth and breadth in learning. This structure affords students and faculty with skills that address the complex and interconnected challenges of the future, where it is no longer possible for these problems to be solved in a single discipline or profession. It is through the connections and communication between specialized knowledge areas that significant cultural progress will be made. These kinds of thoughts and actions form a fundamental part of the College of Architecture, Arts, and Humanities.

To illustrate these ideas, consider the diversity of communication skills practiced and taught in the College. Students learn graphic and artistic communication, technical communication with computers, spoken communication, and communication through the written word. Each skill is vital to a successful student, and it is the collaboration between these forms of communication that prepares students for the complex challenges of the future.

SCHOOL OF DESIGN AND BUILDING AND SCHOOL OF THE ARTS

The Bachelor of Arts in Architecture degree is the preprofessional preparation for two years of graduate study leading to the Master of Architecture degree, which is the fully accredited professional degree in the field. The accredited Bachelor of Science in Construction Science and Management program prepares students for careers as professional managers in the construction industry. A graduate program is also offered leading to the Master of Construction Science and Management. The Fine Arts program offers professional study in the studio visual arts leading to the Bachelor of Fine Arts degree. A graduate program leading to the Master of Fine Arts is also offered. The accredited five-year Bachelor of Landscape Architecture degree program prepares students for careers as professional landscape architects. A graduate program in City and Regional Planning is housed within the school and accepts graduates from a variety of baccalaureate programs and prepares them for careers in both public and private sector planning through its Master of City and Regional Planning degree.

In addition to the facilities housed on the Clemson campus, the College offers students the opportunity to study at two off-campus sites. The center at the College of Charleston is available to third- and fourth-year architecture and fourth-year landscape architecture students for a semester's study while earning credit from both Clemson University and the College of Charleston. The Charles E. Daniel Center for Building Research and Urban Studies in Genoa, Italy, provides graduate students and upper division undergraduates in the above mentioned programs a semester's residence in an intensive program of study and travel while earning full credit toward their degrees.

Entrance Requirements

Admission to degree programs in the School of Design and Building and the School of the Arts is based on academic performance and is limited based on space availability in the various programs. Students seeking admission are advised to apply to the Admissions Office early in the fall of their senior year in high school. They are also encouraged to visit the school during their senior year. Faculty are available to meet with them and their parents informally and answer questions and discuss individual programs in more detail. Prospective students may schedule appointments by calling the individual department.

Change of Major

When space is available, a student may change majors to one of the degree programs in the School of Design and Building with a 2.5 cumulative grade-point ratio, at least 30 credit hours earned, and design aptitude evidenced by a portfolio review (in the case of the Architecture discipline) or by approval of the department chair.

Advancement in Architecture

Students enrolled in second-, third-, or fourth-year design studios and theory courses must attain at least a 2.0 grade-point ratio in each year level (by repeating one or both semesters, if necessary) to qualify for advancement to the next year level or in the case of fourth-year Architecture studios, to qualify for the Architecture degree, or in Landscape Architecture at the fifth year to qualify for the Bachelor of Landscape Architecture degree.

SCHOOL OF HUMANITIES

The Bachelor of Arts degree is offered in English, History, Language and International Trade, Modern Languages, Philosophy, and Speech and Communication Studies.

To achieve depth as well as breadth in their educational experiences, students majoring in English, History, Modern Languages, Philosophy, or Speech and Communication Studies complete at least 24 semester hours from courses above the sophomore level. As soon as feasible and not later than the end of the sophomore year, students in these fields also select a minor, consisting of at least 15 additional semester hours. Courses satisfying the major may not also be included in the minor. A second major (a double major) may substitute for the minor, provided all requirements are fulfilled for each major.

The Bachelor of Arts in English, History, Modern Languages, Philosophy, and Speech and Communication Studies requires 130 total semester credits; Language and International Trade requires 129–137, depending on the concentration. Of these, at least 12 credits must be earned in humanities courses numbered 300 or higher (A A H 210, MUSIC 210 and THEA 210 excepted) and at least 12 credits in social science courses numbered 300 or higher. The humanities for this purpose are considered to include art and architectural history, English (except 304, 312, 314, 316, 331, 333, 334, 335, 485, 490, 495), languages, music, philosophy, religion, speech (except 362 and 364), theatre (except 377, 487, and 497), and women's studies, as well as courses entitled humanities. The social sciences for this purpose are considered to include agricultural and applied economics, anthropology, economics, geography, history, political science, psychology, and sociology. The foreign language requirement in humanities is a proficiency requirement. Students must complete through 202 in Chinese, French, German, Italian, Japanese, Latin, Portuguese, Russian, or Spanish.

Students enrolled in degree programs offered in the humanities who expect to teach in the public schools may elect education courses required for teaching certificates by the South Carolina State Department of Education. Such courses are to be approved by their own department advisors.

Students may transfer into the Undeclared category in the Humanities only if they have completed 45 or fewer credit hours.

ARCHITECTURE

Bachelor of Arts

Architects have a creative responsibility of designing the buildings which shape our physical environment. To understand the humanistic, economic, and technological nature of environmental problems, students must have a sound general education. Subsequent professional education must be preparation for a life of continuing change in which the problems to be solved will be large and small, for every sort of function, in every type of climate, and for every condition of budget.

Architectural Registration/Licensure

Most states require that an individual intending to become an architect hold an accredited degree. There are two types of degrees that are accredited by the National Architectural Accrediting Board: (1) the Bachelor of Architecture, which requires a minimum of five years of study, and (2) the Master of Architecture, which requires a minimum of three years of study following an unrelated bachelor's degree or two years following a related preprofessional bachelor's degree. The professional degrees are structured to educate those who aspire to registration/licensure as architects.

The four-year preprofessional degree, where offered, is not accredited by NAAB; it is useful for those wishing a foundation in the field of architecture, as preparation for either continued education in a professional degree program, or for employment options in architecturally related areas.

Freshman Year

First Semester
4 - ARCH 151 Collaborative Studio I
3 - ENGL 101 Composition I
3 - HIST 172 Western Civilization
4 - MTHSC 106 Calculus of One Variable I
4 - Foreign Language Requirement
18

Second Semester
3 - ARCH 152 Collaborative Studio II
3 - ENGL 102 Composition II
3 - HIST 173 Western Civilization
3 - MTHSC 301 Stat. Theory and Methods I
4 - Foreign Language Requirement
1 - Elective
17

Sophomore Year

First Semester
3 - A A H 101 Survey of Art and Arch. History I
4 - ARCH 251 Collaborative Studio III
3 - ENGL 207 Survey of World Literature I
4 - PHYS 207 General Physics I
3 - Foreign Language Requirement
17

Second Semester
3 - A A H 102 Survey of Art and Arch. History II
4 - ARCH 252 Collaborative Studio IV
3 - ENGL 208 Survey of World Literature II
4 - PHYS 208 General Physics II
3 - Foreign Language Requirement
17

Junior Year

First Semester
3 - A A H 203 History and Theory of Arch. I
6 - ARCH 351 Architecture Studio I
3 - C S M 201 Structures I
3 - C S M 203 Materials and Methods of Const. I
3 - Minor
18

Second Semester
3 - A A H 204 History and Theory of Arch. II
6 - ARCH 352 Architecture Studio II
3 - C S M 202 Structures II
3 - C S M 205 Materials and Meth. of Const. II
3 - Minor
18

Senior Year

First Semester
6 - ARCH 451 Architecture Studio III
3 - C S M 304 Environmental Systems I
3 - Humanities Seminar[1]
3 - Minor
3 - Elective
18

Second Semester
6 - ARCH 452 Architecture Studio IV
6 - Minor
6 - Elective
18

141 Total Semester Hours

[1]See advisor.

CONSTRUCTION SCIENCE AND MANAGEMENT

Bachelor of Science

As the largest single industry in the United States and one of the most important, construction offers unlimited opportunities to highly motivated and professionally educated men and women. Future professionals must be skilled in managing people, equipment, and capital, coupled with a grasp of construction materials and methods and the complex technologies of modern construction. The Bachelor of Science in Construction Science and Management curriculum is the basis for a career in construction or as a developer or building management specialist.

Freshman Year

First Semester
3 - A A H 210 Intro. to Art and Architecture
3 - ARCH 201 Introduction to Architecture
3 - ENGL 101 Composition I
4 - MTHSC 106 Calculus of One Variable I[1]
4 - PHYS 207 General Physics I
17

Second Semester
3 - C S M 100 Introduction to Construction Science and Management
3 - CP SC 120 Intro. to Information Technology
3 - ENGL 102 Composition II
3 - MTHSC 301 Stat. Theory and Methods I[1]
4 - PHYS 208 General Physics II
16

Sophomore Year

First Semester
2 - B E 221 Surveying for Soil and Water Res.
3 - C S M 201 Structures I
3 - C S M 203 Materials and Methods of Const. I
3 - ECON 211 Principles of Microeconomics
3 - Literature Requirement[2]
3 - Elective
17

Second Semester
3 - ACCT 201 Financial Accounting Concepts
3 - C S M 202 Structures II
3 - C S M 204 Contract Documents
3 - C S M 205 Materials and Methods of Const. II
3 - ECON 212 Principles of Macroeconomics
3 - SPCH 150 Intro. to Speech Communication *or*
3 - SPCH 250 Public Speaking
18

Junior Year

First Semester
3 - C S M 301 Structures III
3 - C S M 303 Soils and Foundations
3 - C S M 304 Environmental Systems I
3 - C S M 351 Construction Estimating
3 - ENGL 304 Business Writing *or*
3 - ENGL 314 Technical Writing
3 - Elective
18

Second Semester
3 - C S M 352 Construction Scheduling
3 - C S M 353 Construction Estimating II
3 - LAW 322 Legal Environment of Business
3 - MGT 307 Personnel Management
3 - Major Requirement[3]
3 - Elective
18

Senior Year

First Semester
3 - C S M 411 Safety in Building Construction
3 - C S M 453 Construction Project Management
3 - C S M 461 Construction Economics Seminar
6 - Major Requirement[3]
15

Second Semester
6 - C S M 454 Construction Capstone
0 - C S M 491 CSM Internship and Examination
6 - Major Requirement[3]
3 - Elective
15

134 Total Semester Hours

[1]The sequence MTHSC 101, 102, and 203 may be substituted.

[2]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[3]Select from approved departmental list or as approved in writing by advisor and department chair. *Note:* Six credit hours must be in business.

Notes:

1. ENGL 101 and 102 must be completed in the freshman year.
2. A minimum of 800 hours of construction experience will be required prior to graduation.

ENGLISH

Bachelor of Arts

The purposes of a major in English are to help students acquire an understanding of our literary heritage; develop an appreciation and practical knowledge of the modes of literary expression, research, and criticism; improve the ability to write effectively and intelligently; gain insights into literature as a humane study; and prepare for advanced work in English language, literature, and related disciplines.

The program of study consists of courses stipulated in the basic curriculum[1] for the Bachelor of Arts and 25 semester hours of English, arranged as follows:

Group I—ENGL 190 and 411.
Group II—Three credits from ENGL 405, 407, 408, 409, 410, 412, 413, 414.
Group III—Three credits from ENGL 406, 415, 416, 417, 418.
Group IV—Three credits from ENGL 422, 423, 424, 425.
Group V—Three credits from ENGL 400, 401, 435, (SPCH) 491, (SPCH) 492.
Group VI—Nine additional credits from 300- and 400-level courses, with at least six credits from the 400 level.

Proficiency in composition is required of all English majors and minors. Students with writing problems must overcome them in the Writing Laboratory.

Electives are added as necessary to meet the minimum number of 130 hours required for graduation.

[1]No course may be used to satisfy both major and minor requirements.

Freshman Year

First Semester
3 - ENGL 101 Composition I
3 - HIST 172 Western Civilization
4 - Foreign Language Requirement
3 - Mathematical Sciences Requirement[1]
4 - Science Requirement[2]
17

Second Semester
3 - ENGL 102 Composition II
3 - HIST 173 Western Civilization
4 - Foreign Language Requirement
3 - Mathematical Sciences Requirement[1]
4 - Science Requirement[2]
17

Sophomore Year

First Semester
3 - CP SC 120 Intro. to Information Technology
3 - Fine Arts Requirement[3]
3 - Foreign Language Requirement
3 - Literature Requirement[4]
6 - Elective
18

Second Semester
3 - Foreign Language Requirement
3 - Literature Requirement[4]
10 - Major and Minor Areas
16

Junior Year

First Semester
9 - Major and Minor Areas
3 - Oral Communication Requirement[2]
3 - Writing Intensive Requirement[2]
15

Second Semester
3 - History Requirement[5]
6 - Major and Minor Areas
3 - Philosophy or Religious Studies Requirement[6]
3 - Elective
15

Senior Year

First Semester
3 - History Requirement[5]
9 - Major and Minor Areas
5 - Elective
17

Second Semester
6 - Advanced Social Science Requirement[1]
9 - Major and Minor Areas
15

130 Total Semester Hours

[1]See advisor.

[2]See General Education Requirements.

[3]Select from A A H 101, 210, ENGL 357, HUM 301, 302, 306, MUSIC 210, 311, 415, 416, THEA 210.

[4]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210; 203 and 204 or 207 and 208 are recommended.

[5]Select from the following sequences: HIST 361/363, 316/361, 316/363, 316/365.

[6]Select from PHIL 101, 102, 103, REL 101, 102.

FINE ARTS

Bachelor of Fine Arts

The Bachelor of Fine Arts degree is the recognized professional undergraduate degree in the visual arts. The program in Fine Arts prepares students interested in a balanced curriculum of academic coursework and studio art and art history courses for careers in studio-related areas of the visual arts.

Students begin to concentrate their studio coursework in a specific area of the visual arts—ceramics, drawing, painting, photography, printmaking, or sculpture—in the junior year in preparation for the senior studio experience. The program is structured so that the concentrated studio experiences in the junior year allow students opportunities to explore and develop concepts and skills that lead to a cohesive body of artwork in the senior year and a portfolio for professional application or graduate study.

Freshman Year

First Semester
3 - A A H 101 Survey of Art and Arch. History I
3 - ART 151 Foundations in 2D Art
1 - ART 153 Orientation to Visual Arts I
3 - ART 205 Beginning Drawing
3 - ENGL 101 Composition I
3 - MTHSC 101 Introduction to Probability
16

Second Semester
3 - A A H 102 Survey of Art and Arch. History II
3 - ART 152 Foundations in 3D Art
1 - ART 154 Orientation to Visual Arts II
3 - ART 207 Beginning Painting
3 - ENGL 102 Composition II
3 - MTHSC 102 Intro. to Mathematical Analysis
16

Sophomore Year

First Semester
3 - A A H 205 History and Theory of Art I
3 - ART 209 Beginning Sculpture
3 - ART 211 Beginning Printmaking
3 - Computer Skills Requirement[1]
4 - Science Requirement[1]
16

Second Semester
3 - A A H 206 History and Theory of Art II
3 - ART 213 Beginning Photography
3 - ART 217 Beginning Ceramics
3 - ART 305 Drawing
4 - Science Requirement[1]
16

Junior Year

First Semester
3 - A A H 305 Contemporary Art History
6 - Art 300/400 Requirement
3 - Studio Requirement[2]
3 - Writing Intensive Requirement[1]
3 - Elective
18

Second Semester
6 - Art 300/400 Requirement
3 - Humanities Requirement E.1[1]
3 - Oral Communication Requirement[1]
3 - Studio Requirement[2]
3 - Elective
18

Senior Year

First Semester
5 - ART 471 BFA Senior Studio I
3 - Art 300/400 Requirement
3 - Social Science Requirement[1]
3 - Studio Requirement[2]
3 - Elective
17

Second Semester
5 - ART 472 BFA Senior Studio II
3 - Art 300/400 Requirement
3 - Social Science Requirement[1]
3 - Studio Requirement[2]
3 - Elective
17

134 Total Semester Hours

[1]See General Education Requirements.

[2]All ART courses and other courses approved by the major advisor.

HISTORY

Bachelor of Arts

The recommended program consists of the required courses in the basic curriculum, plus GEOG 103 or 306 (with consent of instructor) and 30 additional credits in history, including two courses at the 400 level, one of which must be HIST 490. Additional electives are added as needed to meet the minimum of 130 semester hours required for graduation.

Pre-law students majoring in History should consult the departmental advisor for a recommended program.

Freshman Year

First Semester
3 - ENGL 101 Composition I
3 - HIST 172 Western Civilization
3 - MTHSC 101 Introduction to Probability[1]
4 - Foreign Language Requirement
4 - Science Requirement[2]
17

Second Semester
3 - ENGL 102 Composition II
3 - HIST 173 Western Civilization
3 - MTHSC 102 Intro. to Mathematical Analysis[1]
4 - Foreign Language Requirement
4 - Science Requirement[2]
17

Sophomore Year

First Semester
3 - Computer Skills Requirement[2]
3 - Foreign Language Requirement
3 - Literature Requirement[3]
9 - Major and Minor Areas
18

Second Semester
6 - Advanced Humanities Requirement[4]
3 - Foreign Language Requirement
3 - Literature Requirement[3]
4 - Elective
16

Junior Year

First Semester
9 - Major and Minor Areas
3 - Writing Intensive Requirement[2]
3 - Elective
15

Second Semester
12 - Major and Minor Areas
3 - Oral Communication Requirement[2]
15

Senior Year

First Semester
6 - Advanced Humanities Requirement[4]
9 - Major and Minor Areas
2 - Elective
17

Second Semester
9 - Major and Minor Areas
6 - Elective
15

130 Total Semester Hours

[1]Students may pursue alternate sequences such as the following: MTHSC 101 and 106 or 203; 102 and 207; or 106 and 108, 207, 301.
[2]See General Education Requirements.
[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.
[4]See advisor.

LANDSCAPE ARCHITECTURE

Bachelor of Landscape Architecture

As practicing design professionals, landscape architects base their land area design plans on very highly developed design standards and a keen awareness of the environmental and cultural context of the site. Landscape architects are active in the design of regional and city plans, urban designs, urban plazas, city parks and playgrounds, athletic fields, marinas, and other recreational areas. They design housing areas of all types, industrial and office parks, medical and academic campuses, parkways and bike ways, courtyards and backyards.

To succeed in landscape architecture, individuals must first enjoy creating something new or recreating something old. They must also see the study of landscape architecture as a way to improve the environment through an enlightened application of design on the land.

The five-year program leads to the professional degree, Bachelor of Landscape Architecture. Students can use the professional support course requirement to tailor the degree to an area of specialization such as construction, architecture, horticulture, business, city and regional planning, etc. Seniors who have been accepted into Clemson's graduate program in City and Regional Planning may fulfill the Professional Support Requirement with C R P courses, which will also count toward the requirements for the Master of City and Regional Planning Degree. Following completion of the Bachelor of Landscape Architecture degree, most states require a two or three-year work experience before taking the professional license examination.

Freshman Year

First Semester
3 - ENGL 101 Composition I
3 - GEOG 101 Introduction to Geography
3 - GEOL 101 Physical Geology[1]
1 - GEOL 103 Physical Geology Lab.[1]
3 - LARCH 151 Basic Design I
1 - LARCH 153 Landscape Arch. Design Theory I
3 - MTHSC 102 Intro. to Mathematical Analysis[2]
17

Second Semester
3 - ENGL 102 Composition II
3 - EX ST 301 Introductory Statistics[2]
3 - GEOL 112 Earth Resources[1]
1 - GEOL 114 Earth Resources Lab.[1]
3 - LARCH 152 Basic Design II
1 - LARCH 154 Landscape Arch. Des. Theory II
3 - Computer Skills Requirement[3]
1 - Elective
18

Sophomore Year

First Semester
3 - A A H 101 Survey of Art and Arch. History I
3 - GEOG 305 Cultural Geography
6 - LARCH 251 Basic Design III
3 - Art Requirement[4]
3 - Oral Communication Requirement[3]
18

Second Semester
3 - A A H 102 Survey of Art and Arch. History II
3 - AG M 301 Soil and Water Conservation
6 - LARCH 252 Basic Design IV
3 - LARCH 262 Landscape Arch. Technology I
3 - Writing Intensive Requirement[3]
18

Maymester

3 - LARCH 421 Landscape Architectural Seminar

Junior Year

First Semester
3 - A A H 416 History of Landscape Architecture
2 - B E 221 Surveying for Soil and Water Res.
3 - HORT 303 Plant Materials
6 - LARCH 351 Landscape Architecture Design Studio I
3 - LARCH 362 Landscape Arch. Technology II
17

Second Semester
3 - HORT 101 Horticulture
4 - HORT 461 Problems in Landscape Design
6 - LARCH 352 Landscape Arch. Design II
3 - Computer-Aided Design Requirement[5]
16

Summer

1 - LARCH 293 Field Studies Internship *or*
1 - LARCH 493 Prof. Office Internship[6]
1

Senior Year[7]

First Semester
6 - LARCH 451 Landscape Arch. Design III
3 - LARCH 462 Landscape Arch. Technology III
3 - Humanities Requirement E.1[3]
3 - Elective
15

Second Semester
6 - LARCH 452 Landscape Arch. Design IV
3 - LARCH 581 Landscape Arch. Prof. Practice
6 - Elective
15

Summer

1 - LARCH 293 Field Studies Internship *or*
1 - LARCH 493 Prof. Office Internship[6]
1

Professional Year

First Semester[8]
15 - Professional Support Requirement[9]
15

Second Semester
6 - LARCH 552 Landscape Arch. Design VI
7 - Professional Support Requirement[9]
13

167 Total Semester Hours

[1]BIOL 101/102, 103/104, or PHYS 207/208 may be substituted.
[2]MTHSC 106 may substitute for MTHSC 102. MTHSC 301 may substitute for EX ST 301.
[3]See General Education Requirements.
[4]Any 200-level ART course.
[5]ARCH 426, 427, 428, LARCH 428 or other computer-aided design courses as approved.
[6]Up to six credit hours of LARCH 293 or LARCH 493 may be scheduled during summer sessions.
[7]Exceptional students may be permitted to spend the spring semester at the Architecture Center in Charleston.
[8]Exceptional students may be permitted to spend the fall semester at the Daniel Center in Genoa, Italy.
[9]Select from approved departmental list or as approved in writing by advisor and department chair.

LANGUAGE AND INTERNATIONAL TRADE

Bachelor of Arts

The Bachelor of Arts program in Language and International Trade helps students acquire a basic use of the four language skills (listening, reading, speaking, and writing); a familiarity with specific peoples, cultures, literatures, and business environments; and the knowledge and skills to pursue graduate studies or careers in business.

The Language and International Trade program combines foreign languages and international trade. Students choose one language concentration (French, German, Japanese, or Spanish) and one professional concentration (Applied International Economics, International Trade, Textiles, or Tourism).

A summer internship between the junior and senior years gives students the opportunity to apply classroom learning to a business/industrial work environment. Language and International Trade majors are also encouraged to participate in Study Abroad programs to increase language proficiency.

The language concentration emphasizes speaking and writing skills, culture, civilization, and business/technical languages. The professional component emphasizes international marketing in areas important to the economy of the state and the nation.

In addition to the requirements outlined below, students will be required, as a condition of graduation, to pass a noncredit examination to determine language proficiency. The examination will be taken in the student's last full semester at the University.

Freshman Year

First Semester

3 - CP SC 120 Intro. to Information Technology
3 - ENGL 101 Composition I
4 - JAPN 101 Elementary Japanese[1]
1 - L&IT 127 Intro. to Lang. and International Trade
3 - MTHSC 102 Intro. to Mathematical Analysis
4 - Science Requirement[2]
14-18

Second Semester

3 - ENGL 102 Composition II
4 - FR 102 Elementary French *or*
  4 - GER 102 Elementary German *or*
  4 - JAPN 102 Elementary Japanese *or*
  4 - SPAN 102 Elementary Spanish
3 - HIST 172 Western Civilization
3 - MTHSC 207 Multivariable Calculus
4 - Science Requirement[2]
17

[1]Students are expected to have completed the first semester of elementary language in high school or in a Clemson summer session before the first semester of the freshman year, except for Japanese.

[2]See General Education Requirements.

APPLIED INTERNATIONAL ECONOMICS CONCENTRATION

Sophomore Year

First Semester

3 - AP EC 202 Agricultural Economics
3 - ECON 212 Principles of Macroeconomics
3 - FR 201 Intermediate French *or*
  3 - GER 201 Intermediate German *or*
  3 - JAPN 201 Intermediate Japanese *or*
  3 - SPAN 201 Intermediate Spanish
3 - SPCH 251 Business and Professional Speaking
3 - Literature Requirement[1]
3 - Elective
18

Second Semester

3 - ACCT 201 Financial Accounting Concepts
3 - FR 202 Intermediate French *or*
  3 - GER 202 Intermediate German *or*
  3 - JAPN 202 Intermediate Japanese *or*
  3 - SPAN 202 Intermediate Spanish
3 - GEOG 103 World Regional Geography
3 - HIST 173 Western Civilization
6 - Elective
18

Junior Year

First Semester

3 - ENGL 316 Writing and International Trade
3 - FR 305 Intermed. French Conv. and Comp. I *or*
  3 - GER 305 Inter. German Conv. and Comp. *or*
  3 - JAPN 305 Japanese Conv. and Comp. *or*
  3 - SPAN 305 Inter. Spanish Conv. and Comp. I
3 - MKT 301 Principles of Marketing
3 - Advanced Social Science Requirement[2]
3 - Civilization Requirement[3]
15

Second Semester

3 - EX ST 462 Statistics Applied to Economics
3 - FR 316 French for International Trade I *or*
  3 - GER 316 German for Int. Trade I *or*
  3 - JAPN 316 Japanese for Int. Trade I *or*
  3 - SPAN 316 Spanish for International Trade I
3 - FR 411 Adv. French Conv. and Comp. *or*
  3 - GER 411 Studies in the German Lang. I *or*
  3 - JAPN 411 Studies in the Japanese Lang. I *or*
  3 - SPAN 411 Adv. Spanish Conv. and Comp.
3 - MKT 427 International Marketing
3 - Foreign Language 300/400-level Requirement[4]
15

Summer

3 - L&IT 400 L&IT Internship *or*
  3 - L&IT 401 L&IT Practicum
3

Senior Year

First Semester

3 - AP EC 409 Commodity Futures Markets
3 - FR 416 French for International Trade II *or*
  3 - GER 416 German for Int. Trade II *or*
  3 - JAPN 416 Japanese for Int. Trade II *or*
  3 - SPAN 416 Spanish for Int. Trade II
3 - MKT 423 Promotional Strategy
3 - Foreign Language 300/400-level Requirement[4]
2 - Elective
14

Second Semester

3 - AP EC 420 World Agricultural Trade
3 - ECON 310 International Economy *or*
  3 - ECON 412 International Microeconomics
3 - Fine Arts Requirement[5]
3 - Foreign Language 300/400-level Requirement[4]
3 - Elective
15

129-133 Total Semester Hours

[1]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[2]Twelve hours in social sciences are required at the 300–400 level. This includes AP EC, ANTH, ECON, GEOG, HIST, PO SC, PSYCH, and SOC.

[3]To be selected from FR, JAPN, or SPAN 307; or FR, GER, JAPN, or SPAN 308; or GER 413; or SPAN 435.

[4]A minimum of nine hours of 300–400-level foreign language courses is required. At least one course must be in literature. Advanced grammar is recommended for those exempting 100/200 levels.

[5]Three credits from A A H, MUSIC, or THEA (practica with the approval of the department chair).

INTERNATIONAL TRADE CONCENTRATION

Sophomore Year

First Semester

3 - ECON 211 Principles of Microeconomics
3 - FR 201 Intermediate French *or*
  3 - GER 201 Intermediate German *or*
  3 - JAPN 201 Intermediate Japanese *or*
  3 - SPAN 201 Intermediate Spanish
3 - HIST 173 Western Civilization
3 - SPCH 251 Business and Professional Speaking
3 - Advanced Social Science Requirement[1]
3 - Literature Requirement[2]
18

Second Semester

3 - ACCT 201 Financial Accounting Concepts
3 - FR 202 Intermediate French *or*
  3 - GER 202 Intermediate German *or*
  3 - JAPN 202 Intermediate Japanese *or*
  3 - SPAN 202 Intermediate Spanish
3 - LAW 322 Legal Environment of Business
3 - Advanced Social Science Requirement[1]
3 - Elective
15

Junior Year

First Semester

3 - ECON 310 International Economy *or*
  3 - ECON 412 International Microeconomics
3 - ENGL 316 Writing and International Trade
3 - FR 305 Intermed. French Conv. and Comp. I *or*
  3 - GER 305 Inter. German Conv. and Comp. *or*
  3 - JAPN 305 Japanese Conv. and Comp. *or*
  3 - SPAN 305 Inter. Spanish Conv. and Comp. I
3 - MKT 301 Principles of Marketing
3 - Civilization Requirement[3]
15

Second Semester
3 - FR 316 French for International Trade I *or*
3 - GER 316 German for Int. Trade I *or*
3 - JAPN 316 Japanese for Int. Trade I *or*
3 - SPAN 316 Spanish for International Trade I
3 - FR 411 Adv. French Conv. and Comp. *or*
3 - GER 411 Studies in the German Lang. I *or*
3 - JAPN 411 Studies in the Japanese Lang. I *or*
3 - SPAN 411 Adv. Spanish Conv. and Comp.
3 - MKT 427 International Marketing
3 - MTHSC 301 Statistical Theory and Methods I
3 - Foreign Language 300/400-level Requirement[4]
3 - Elective
18

Summer
3 - L&IT 400 L&IT Internship *or*
3 - L&IT 401 L&IT Practicum
3

Senior Year
First Semester
3 - FIN 306 Corporation Finance
3 - FR 416 French for International Trade II *or*
3 - GER 416 German for Int. Trade II *or*
3 - JAPN 416 Japanese for Int. Trade II *or*
3 - SPAN 416 Spanish for Int. Trade II
3 - MGT 301 Principles of Management
3 - Advanced Social Science Requirement[1]
3 - Foreign Language 300/400-level Requirement[4]
15

Second Semester
3 - MGT 418 Management Information Systems
3 - MGT 424 Int. Transportation and Logistics
3 - Fine Arts Requirement[5]
3 - Foreign Language 300/400-level Requirement[4]
6 - Elective
18

133-137 Total Semester Hours

[1]Twelve hours in social sciences are required at the 300–400 level. This includes AP EC, ANTH, ECON, GEOG, HIST, PO SC, PSYCH, and SOC.

[2]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[3]To be selected from FR, JAPN, or SPAN 307; or FR, GER, JAPN, or SPAN 308; or GER 413; or SPAN 435.

[4]A minimum of nine hours of 300–400-level foreign language courses is required. At least one course must be in literature. Advanced grammar is recommended for those exempting 100/200 levels.

[5]Three credits from A A H, MUSIC, or THEA (practica with the approval of the department chair).

TEXTILES CONCENTRATION

Sophomore Year
First Semester
3 - ECON 211 Principles of Microeconomics *or*
3 - ECON 212 Principles of Macroeconomics
3 - FR 201 Intermediate French *or*
3 - GER 201 Intermediate German *or*
3 - JAPN 201 Intermediate Japanese *or*
3 - SPAN 201 Intermediate Spanish
3 - SPCH 251 Business and Professional Speaking
3 - TEXT 460 Textile Processes
3 - Literature Requirement[1]
3 - Elective
18

Second Semester
3 - ACCT 201 Financial Accounting Concepts
3 - FR 202 Intermediate French *or*
3 - GER 202 Intermediate German *or*
3 - JAPN 202 Intermediate Japanese *or*
3 - SPAN 202 Intermediate Spanish
3 - HIST 173 Western Civilization
6 - Advanced Social Science Requirement[2]
3 - Elective
18

Junior Year
First Semester
3 - ENGL 316 Writing and International Trade
3 - FR 305 Intermed. French Conv. and Comp. I *or*
3 - GER 305 Inter. German Conv. and Comp. *or*
3 - JAPN 305 Japanese Conv. and Comp. *or*
3 - SPAN 305 Inter. Spanish Conv. and Comp. I
3 - MKT 301 Principles of Marketing
4 - TEXT 314 Chemical Processing of Textiles
3 - Civilization Requirement[3]
16

Second Semester
3 - FR 316 French for International Trade I *or*
3 - GER 316 German for Int. Trade I *or*
3 - JAPN 316 Japanese for Int. Trade I *or*
3 - SPAN 316 Spanish for International Trade I
3 - FR 411 Adv. French Conv. and Comp. *or*
3 - GER 411 Studies in the German Lang. I *or*
3 - JAPN 411 Studies in the Japanese Lang. I *or*
3 - SPAN 411 Adv. Spanish Conv. and Comp.
4 - TEXT 308 Apparel
3 - Foreign Language 300/400-level Requirement[4]
3 - Elective
16

Summer
3 - L&IT 400 L&IT Internship *or*
3 - L&IT 401 L&IT Practicum
3

Senior Year
First Semester
3 - FR 416 French for International Trade II *or*
3 - GER 416 German for Int. Trade II *or*
3 - JAPN 416 Japanese for Int. Trade II *or*
3 - SPAN 416 Spanish for Int. Trade II
3 - MKT 427 International Marketing
3 - TEXT 422 Properties of Textile Structures
3 - Advanced Social Science Requirement[2]
3 - Foreign Language 300/400-level Requirement[4]
15

Second Semester
3 - ECON 310 International Economy *or*
3 - ECON 412 International Microeconomics
3 - TEXT 475 Textile Marketing
3 - Fine Arts Requirement[5]
3 - Foreign Language 300/400-level Requirement[4]
4 - Elective
16

133-137 Total Semester Hours

[1]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[2]Twelve hours in social sciences are required at the 300–400 level. This includes AP EC, ANTH, ECON, GEOG, HIST, PO SC, PSYCH, and SOC.

[3]To be selected from FR, JAPN, or SPAN 307; or FR, GER, JAPN, or SPAN 308; or GER 413; or SPAN 435.

[4]A minimum of nine hours of 300–400-level foreign language courses is required. At least one course must be in literature. Advanced grammar is recommended for those exempting 100/200 levels.

[5]Three credits from A A H, MUSIC, or THEA (practica with the approval of the department chair).

TOURISM CONCENTRATION

Sophomore Year
First Semester
3 - ECON 211 Principles of Microeconomics
3 - FR 201 Intermediate French *or*
3 - GER 201 Intermediate German *or*
3 - JAPN 201 Intermediate Japanese *or*
3 - SPAN 201 Intermediate Spanish
3 - PRTM 342 Introduction to Tourism
3 - SPCH 251 Business and Professional Speaking
3 - Literature Requirement[1]
3 - Elective
18

Second Semester
3 - ACCT 201 Financial Accounting Concepts
3 - FR 202 Intermediate French *or*
3 - GER 202 Intermediate German *or*
3 - JAPN 202 Intermediate Japanese *or*
3 - SPAN 202 Intermediate Spanish
3 - HIST 173 Western Civilization
6 - Advanced Social Science Requirement[2]
3 - Elective
18

Junior Year
First Semester
3 - ENGL 316 Writing and International Trade
3 - FR 305 Intermed. French Conv. and Comp. I *or*
3 - GER 305 Inter. German Conv. and Comp. *or*
3 - JAPN 305 Japanese Conv. and Comp. *or*
3 - SPAN 305 Inter. Spanish Conv. and Comp. I
3 - MKT 301 Principles of Marketing
3 - PRTM 343 Spatial Aspects of Tourist Behavior
3 - Civilization Requirement[3]
15

Second Semester
3 - FR 316 French for International Trade I *or*
3 - GER 316 German for Int. Trade I *or*
3 - JAPN 316 Japanese for Int. Trade I *or*
3 - SPAN 316 Spanish for International Trade I
3 - FR 411 Adv. French Conv. and Comp. *or*
3 - GER 411 Studies in the German Lang. I *or*
3 - JAPN 411 Studies in the Japanese Lang. I *or*
3 - SPAN 411 Adv. Spanish Conv. and Comp.
3 - Foreign Language 300/400-level Requirement[4]
3 - PRTM 300/400-level Requirement[5]
3 - Elective
15

Summer
3 - L&IT 400 L&IT Internship *or*
3 - L&IT 401 L&IT Practicum
3

Senior Year

First Semester

3 - FR 416 French for International Trade II *or*
3 - GER 416 German for Int. Trade II *or*
3 - JAPN 416 Japanese for Int. Trade II *or*
3 - SPAN 416 Spanish for Int. Trade II
3 - MKT 427 International Marketing
3 - PRTM 444 Tour Planning and Operations
3 - Advanced Social Science Requirement[2]
3 - Foreign Language 300/400-level Requirement[4]
15

Second Semester

3 - ECON 310 International Economy *or*
3 - ECON 412 International Microeconomics
3 - PRTM 447 Perspectives on International Travel
3 - Fine Arts Requirement[6]
3 - Foreign Language 300/400-level Requirement[4]
6 - Elective
18

133-137 Total Semester Hours

[1]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[2]Twelve hours in social sciences are required at the 300–400 level. This includes AP EC, ANTH, ECON, GEOG, HIST, PO SC, PSYCH, and SOC.

[3]To be selected from FR, JAPN, or SPAN 307; or FR, GER, JAPN, or SPAN 308; or GER 413; or SPAN 435.

[4]A minimum of nine hours of 300–400-level foreign language courses is required. At least one course must be in literature. Advanced grammar is recommended for those exempting 100/200 levels.

[5]Three credits in PRTM at the 300–400 level, approved by the Language and International Trade Director.

[6]Three credits from A A H, MUSIC, or THEA (practica with the approval of the department chair).

MODERN LANGUAGES

Bachelor of Arts

The Bachelor of Arts degree in Modern Languages helps students acquire a basic use of the four language skills (listening, reading, speaking, and writing); a familiarity with specific peoples, cultures, and literatures; and the knowledge and foreign-language skills to pursue graduate studies or careers in education or business. All Modern Language majors are encouraged to travel/study abroad.

A student may elect a major in a single language, a double major in two languages, or a double major combining a language major with a Bachelor of Arts major outside the department. All Modern Language majors must complete the courses stipulated in the basic curriculum.

French—Requires FR 305 and 309 plus 24 additional credits in French at the 300–400 level. Six credits of literature courses, three credits of which must be at the 400 level, are required.

German—Requires 24 credits in German at the 300–400-level.

Spanish—Requires 30 credits at the 300–400 levels, of which nine hours must be at the 400 level. A minimum of six hours of literature, including one course at the 400 level, is also required.

As a condition of graduation, students are required to pass a noncredit examination to determine their proficiency in the area. This examination is taken in the student's last full semester at the University.

Freshman Year

First Semester

3 - ENGL 101 Composition I
3 - HIST 172 Western Civilization
3 - MTHSC 101 Introduction to Probability[1]
4 - Foreign Language Requirement
4 - Science Requirement[2]
17

Second Semester

3 - ENGL 102 Composition II
3 - HIST 173 Western Civilization
3 - MTHSC 102 Intro. to Mathematical Analysis[1]
4 - Foreign Language Requirement
4 - Science Requirement[2]
17

Sophomore Year

First Semester

3 - Computer Skills Requirement[2]
3 - Fine Arts Requirement[3]
3 - Foreign Language Requirement
3 - Literature Requirement[4]
6 - Elective
18

Second Semester

3 - Advanced Social Science Requirement[5]
3 - Foreign Language Requirement
3 - Literature Requirement[4]
7 - Elective
16

Junior Year

First Semester

3 - Advanced Social Science Requirement[5]
9 - Major and Minor Areas
3 - Oral Communication Requirement[2]
15

Second Semester

12 - Major and Minor Areas
3 - Writing Intensive Requirement[2]
15

Senior Year

First Semester

9 - Major and Minor Areas
8 - Elective
17

Second Semester

6 - Advanced Social Science Requirement[5]
9 - Major and Minor Areas
15

130 Total Semester Hours

[1]Students may pursue alternate sequences such as the following: MTHSC 101 and 106 or 203; 102 and 207; or 106 and 108, 207, or 301.

[2]See General Education Requirements.

[3]Three credits from A A H, MUSIC, THEA (practica with the approval of the department chair).

[4]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[5]See advisor.

PHILOSOPHY

Bachelor of Arts

The required course of study consists of the basic curriculum and either the standard Philosophy major, the Philosophy major with a Religious Studies Emphasis Area, or the Philosophy major with a Law, Liberty, and Justice Emphasis Area.

The standard Philosophy major consists of PHIL 315, 316, 401 or 402, and 24 additional credits in philosophy selected with the advice and consent of a departmental advisor; three of these 24 credits may be at the 100 level. Additional electives are added as needed to meet the minimum of 130 semester hours required for graduation.

The Philosophy major with a Religious Studies Emphasis Area consists of REL 101 or 102, 301, 302, 401 or 402, PHIL 303, 315, 316, 401 or 402, and nine additional credits selected with the advice and consent of a departmental advisor. Of these nine credits, three must be in philosophy and three must be in religion at the 300 level or above. The remaining three credits may be in either religion or philosophy but must be at the 300 level or above. Students with this emphasis area must choose a minor other than religion. Additional electives are added as needed to meet the minimum of 130 semester hours required for graduation.

The Philosophy major with a Law, Liberty, and Justice Emphasis Area consists of PHIL 102, 304 or 320, 315, 316, 343, 401 or 402, HIST 328, 329, and nine additional credits in philosophy selected with the advice and consent of the departmental pre-law advisor. Students with this emphasis area are strongly advised to partially fulfill their advanced social science requirement by taking one or more of PO SC 432, 433, 434. Additional electives are added as needed to meet the minimum of 130 semester hours required for graduation.

Pre-law and Pre-med students majoring in Philosophy should consult the departmental advisor for help in tailoring the program to their needs.

Freshman Year

First Semester

3 - ENGL 101 Composition I
3 - HIST 172 Western Civilization
3 - MTHSC 101 Introduction to Probability[1]
4 - Foreign Language Requirement
4 - Science Requirement[2]
17

Second Semester

3 - ENGL 102 Composition II
3 - HIST 173 Western Civilization
3 - MTHSC 102 Intro. to Mathematical Analysis[1]
4 - Foreign Language Requirement
4 - Science Requirement[2]
17

Sophomore Year

First Semester

3 - Foreign Language Requirement
3 - Literature Requirement[3]
9 - Major and Minor Areas
3 - Oral Communication Requirement[2]
18

Second Semester
3 - Computer Skills Requirement[2]
3 - Foreign Language Requirement
3 - Literature Requirement[3]
7 - Elective
16

Junior Year

First Semester
9 - Major and Minor Areas
3 - Writing Intensive Requirement[2]
3 - Elective
15

Second Semester
12 - Major and Minor Areas
3 - Elective
15

Senior Year

First Semester
6 - Advanced Social Sciences Requirement[4]
11 - Major and Minor Areas
17

Second Semester
6 - Advanced Social Sciences Requirement[4]
9 - Major and Minor Areas
15

130 Total Semester Hours

[1]Students may pursue alternate sequences such as the following: MTHSC 101 and 106 or 203; 102 and 207; or 106 and 108, 207, or 301.

[2]See General Education Requirements.

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]See advisor.

SPEECH AND COMMUNICATION STUDIES

Bachelor of Arts

The Bachelor of Arts in Speech and Communication Studies is designed to provide a thoroughly integrated yet individual degree program that will prepare students for careers in business, government, and public sectors. In addition, the program provides a foundation for graduates who wish to pursue advanced degrees in the humanities, social sciences, business, and law. Speech and Communication Studies examines communication in a variety of contexts. Students will select an emphasis area that is germane to individual career interests: Organizational Studies, Media Studies, or Relational/Cultural Studies.

SPCH 250 or 251 is required of all Speech and Communication Studies majors.

I. Core Courses (18 hours)

SPCH 201 Intro. to Communication Studies
SPCH 301 Speech Communication Theories
SPCH 302 Mass Communication Theory
SPCH 310 Communication Research Methods
SPCH (ENGL) 491 Classical Rhetoric *or*
SPCH (ENGL) 492 Modern Rhetoric
SPCH 495 Senior Communication Thesis

II. Emphasis Areas (12 hours)

Organizational Studies—SPCH 364, 464, and two courses from SPCH 340, 362, 460.

Media Studies—SPCH 300, 365, and two courses from ENGL 357, SPCH 320, 480.

Relational/Cultural Studies—SPCH 348, 480, and two courses from SPCH 330, 350, 455.

III. General Requirements (6 hours)

Any 300- or 400-level speech course. Additional courses taken under an emphasis area may also be used to fulfill this requirement.

36 total hours

Advanced Social Science Requirement (12 hours)

Electives as needed to complete 130 hours

Freshman Year

First Semester
3 - ENGL 101 Composition I
3 - HIST 172 Western Civilization
4 - Foreign Language Requirement
3 - Mathematical Sciences Requirement[1]
4 - Science Requirement[1]
17

Second Semester
3 - ENGL 102 Composition II
3 - HIST 173 Western Civilization
4 - Foreign Language Requirement
3 - Mathematical Sciences Requirement[1]
4 - Science Requirement[1]
17

Sophomore Year

First Semester
3 - SPCH 250 Public Speaking *or*
3 - SPCH 251 Business and Prof. Speaking
3 - Computer Skills Requirement[1]
3 - Foreign Language Requirement
3 - Literature Requirement[2]
6 - Elective
18

Second Semester
3 - Advanced Social Science Requirement[3]
3 - Foreign Language Requirement
3 - Literature Requirement[2]
6 - Major and Minor Areas
1 - Elective
16

Junior Year

First Semester
3 - Advanced Social Science Requirement[3]
9 - Major and Minor Areas
3 - Writing Intensive Requirement[1]
15

Second Semester
15 - Major and Minor Areas
15

Senior Year

First Semester
3 - Advanced Social Science Requirement[3]
12 - Major and Minor Areas
2 - Elective
17

Second Semester
3 - Advanced Social Science Requirement[3]
9 - Major and Minor Areas
3 - Elective
15

130 Total Semester Hours

[1]See General Education Requirements.

[2]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[3]See advisor.

Note: Students requesting a transfer into the Speech and Communication Studies program with fewer than 50 hours must have a grade-point ratio of 2.3 or higher. Students requesting a transfer into the Speech and Communication Studies program with 50 hours or more must have a grade-point ratio of 2.5 or higher.

MINORS

Following are minors acceptable for students in the College of Architecture, Arts, and Humanities. Students cannot major and minor in the same field or acquire a minor that is not allowed by the degree program.

Students in Landscape Architecture are not eligible to claim a minor.

Accounting
Adult/Extension Education
Aerospace Studies
African American Studies
Agricultural Business Management
Agricultural Mechanization and Business
Anthropology
Aquaculture, Fisheries, and Wildlife Biology
Beef Cattle Production
Biochemistry
Bioengineering
Biological Sciences
Business Administration
Chemistry
Cluster
Communications
Computer Science
Crop and Soil Environmental Science
Early Intervention Specialist—*not open to Fine Arts majors*
Economics
Elementary Education
English
Entomology
Entrepreneurship
Environmental Engineering
Environmental Science and Policy
Film Studies
Financial Management
Fine Arts
Food Science
Forest Products
Forest Resource Management
Geography
Geology
Great Works
Health Science
History
Horse Production
Horticulture
Human Resource Management
International Politics
Legal Studies
Management
Marketing
Mathematical Sciences
Microbiology
Military Science
Modern Languages—*not open to Language and International Trade majors*
Music
Natural Resource Economics
Operations Management
Packaging Science
Parks, Recreation, and Tourism Management
Philosophy
Physics
Plant Pathology
Political Science
Poultry Science
Psychology
Public Policy
Religion
Science and Technology in Society
Screenwriting
Secondary Education
Sociology
Spanish-American Area Studies
Speech and Communication Studies
Textiles
Theatre
Urban Forestry
Women's Studies
Writing

See pages 30-33 for details.

COLLEGE OF BUSINESS AND BEHAVIORAL SCIENCE

The College of Business and Behavioral Science includes the School of Accountancy and Legal Studies and the Departments of Aerospace Studies, Economics, Finance, Graphic Communications, Management, Marketing, Military Science, Political Science, Psychology, Sociology, and the MBA Program.

The mission of the College is

- to develop leaders who are exceptionally qualified, globally competitive, entrepreneurial spirited, and committed to the betterment of society,
- to produce scholarly research that is relevant to our stakeholders, and
- to support professional and public service activities that contribute to economic, social, and intellectual development.

ROTC PROGRAMS

Aerospace Studies (AFROTC)

Air Force Reserve Officer Training Corps provides students the opportunity to earn a commission as second lieutenants while pursuing a bachelor's degree. The program includes courses in air power history, written and oral communications, leadership and management, and political science. Air Force ROTC is designed to meet the need for dedicated and professional leaders in the active duty Air Force. Additional information is available from the Department of Aerospace Studies.

Military Science (Army ROTC)

Army Reserve Officer Training Corps allows students the opportunity to become Army Officers in the Reserves, National Guard, or active Army. The first two years of the program are open to all students and include studies in our nation's Army, leadership, first aid, orienteering, written and oral communication, and time management. The advance program includes juniors and seniors determined to make a commitment and focus more on tactics and leadership. In addition to the military science courses, the complete program requires three additional credits in military history and offers a minor in Military Science. Additional information is available from the Military Science Department.

SOCIAL AND BEHAVIORAL SCIENCE PROGRAMS

Bachelor of Arts degrees are offered in Economics, Political Science, Psychology, and Sociology; Bachelor of Science degrees are also offered in Political Science, Psychology, and Sociology. These programs are designed to meet the needs of students seeking a broad general education with emphasis on the humanities, as preparation for intelligent citizenship, commercial and industrial life, government service, and teaching. These curricula also provide an excellent background for the study of law, journalism, and medicine.

To achieve depth as well as breadth in the educational experience, students select a major consisting of at least 24 credit hours from courses above the sophomore level. Students also choose a minor consisting of at least 15 additional credit hours. Courses satisfying a student's major may not also be included in the minor. See page 65 for acceptable minors.

Students in bachelor of arts programs who expect to teach in the public schools may elect education courses required for teaching certificates by the South Carolina State Department of Education. Such courses are to be approved by their own department advisors.

BUSINESS PROGRAMS

Bachelor of science programs are offered in Accounting, Economics, Financial Management, Graphic Communications, Industrial Management, Management, and Marketing. With the exception of Graphic Communications, these programs share a common curriculum the first year, allowing the student maximum flexibility in choosing the appropriate major. These degrees are accredited by the American Assembly of Collegiate Schools of Business. The curricula prepare students for a variety of careers and furnish an education that recognizes the need for an understanding of the basic principles of science, appreciation for the nature of human interaction, and the comprehension of the economic, political, and social environment.

General Business Program

The General Business Program is designed to provide students planning to earn Bachelor of Science degrees in Accounting, Economics, Financial Management, Industrial Management, Management, and Marketing with a sound academic prepartion for a variety of careers in business. All business students must complete a common curriculum for the freshman year and have a cumulative grade-point ratio of 2.0 or better before being admitted into a business baccalaureate degree program. All new business students (including transfer students) are admitted into General Business until all classes in the freshman curriculum are satisfactorily completed and the grade-point ratio requirement is met.

Freshman Curriculum

First Semester

3 - ECON 211 Principles of Microeconomics
3 - ENGL 101 Composition I
3 - MTHSC 102 Intro. to Mathematical Analysis
3 - Option List
4 - Science Requirement[1]
16

Second Semester

3 - ECON 212 Principles of Macroeconomics
3 - ENGL 102 Composition II
3 - MTHSC 207 Multivariable Calculus
3 - Option List
4 - Science Requirement[1]
16

OPTION LIST

3 - PSYCH 201 Introduction to Psychology *or*
3 - SOC 201 Introduction to Sociology
3 - Computer Skills Requirement[1]
6 - Humanities Requirement E.1 and E.2[1]
6 - International Studies Requirement[2]
3 - Leadership Requirement[3]
3 - Oral Communication Requirement[1]
24

[1]See General Education Requirements.

[2]Complete a two-semester modern foreign language sequence (level to be determined through advising) or six hours of coursework on the culture, geography, history, literature, religion, arts, or political environment of a nation or region other than the United States. A list of approved courses is available through advising. If an eight-hour elementary modern foreign language sequence is chosen, then six hours will be credited to the international studies requirement and two hours to electives.

[3]See advisor.

Admission to Business Degree Programs

To be eligible for admission into a business degree program, students must have completed the 32 credit hours outlined in the freshman curriculum with a cumulative grade-point ratio of 2.0 or better. Students should initiate a change-of-major request after completion of the Freshman Curriculum. Students who fail to meet the requirements for admission to a degree granting business program may remain in General Business until those requirements are met, but only until 64 semester hours of coursework have been completed. Students who exceed 64 credit hours and still do not meet the requirements for admission into a degree program must declare another major. Students petitioning for admission into a business degree program will follow the curriculum in effect at the time of the change.

ACCOUNTING

Bachelor of Science

The program leading to the Bachelor of Science degree in Accounting prepares students for careers as professional accountants. Students completing this program are well prepared to enter many accounting career fields as well as to continue study at the graduate level.

Students planning to become Certified Public Accountants should note that the requirements to sit for the CPA examination in South Carolina include 150 hours of collegiate education and completion of a bachelor's degree. Other states have, or will soon have, similar requirements. The faculty of the School of Accountancy and Legal Studies believes these requirements are best met with a bachelor's degree in Accounting and completion of the Master of Professional Accountancy (MPAcc) degree program. The MPAcc program also enhances the preparation of students pursuing accounting careers in other areas of specialization such as assurance and management services and taxation.

Admission to the MPAcc program is separate from admission to the undergraduate program. It is based on the student's undergraduate record and score on the Graduate Management Admissions Test (GMAT). For information on the MPAcc program, contact the School of Accountancy and Legal Studies, 301 Sirrine Hall.

In addition to accounting and business courses, approximately one-half of the Bachelor of Science curriculum is devoted to English and public speaking, mathematics, natural and social sciences, and the humanities. Thus, students in the accounting program obtain a broad-based education that not only gives them accounting expertise but also contributes to their proficiency in analytical, communication, and interpersonal skills. Along with the general business accreditation held by the College, the degree programs offered by the School of Accountancy and Legal Studies are separately accredited by AACSB, the only accrediting agency for accounting programs.

Sophomore Year

First Semester
3 - EX ST 301 Introductory Statistics *or*
3 - MTHSC 301 Stat. Theory and Methods I
3 - MGT 301 Principles of Management
9 - Option List
1 - Elective
16

Second Semester
3 - ACCT 201 Financial Accounting Concepts
1 - ACCT 204 Accounting Procedures
3 - CP SC 220 Microcomputer Applications
9 - Option List
16

Junior Year

First Semester
3 - ACCT 311 Intermediate Financial Acct. I
3 - ACCT 322 Accounting Information Systems
3 - ENGL 304 Business Writing
3 - FIN 311 Financial Management I
3 - Fine Arts Requirement[1]
1 - Elective
16

Second Semester
3 - ACCT 312 Intermediate Financial Acct. II
3 - ACCT 340 Internal Auditing Theory *or*
3 - ACCT 415 Auditing[2]
3 - FIN 312 Financial Management II
3 - LAW 322 Legal Environment of Business
3 - PHIL 344 Business Ethics
1 - Elective
16

Senior Year

First Semester
3 - ACCT 303 Cost Accounting
3 - ACCT 313 Intermediate Financial Acct. III
3 - ACCT 404 Individual Taxation *or*
3 - ACCT 406 Business Taxation[2]
3 - MKT 301 Principles of Marketing
3 - International Business Requirement[3]
1 - Elective
16

Second Semester
15 - Senior Option (see below)
15

127 Total Semester Hours

Senior Option

(Completion of one of the following options is required.)

INTERNSHIP OPTION

Senior Year
Second Semester
3 - ACCT 399 Internship in Accounting[4]
3

First Summer Session
3 - MGT 415 Business Strategy
3 - Elective
6

Second Summer Session
3 - ACCT 410 Budgeting and Executive Control
3 - Elective
6

BUSINESS MANAGEMENT COURSE OPTION

Senior Year
Second Semester
3 - ACCT 410 Budgeting and Executive Control
3 - MGT 415 Business Strategy
3 - Business Management Requirement[5]
6 - Elective
15

[1]Select from A A H 210, MUSIC 210, THEA 210.

[2]Students planning to pursue the Master of Professional Accountancy degree program should take ACCT 404 and 415. Students planning to work in industry upon completion of the degree program should take ACCT 340 and 406.

[3]Select from ECON 310, FIN 411, LAW 420, MGT 423, MKT 427.

[4]Alternately, an internship may be completed in the summer between junior and senior years with MGT 415, ACCT 410, and six hours of electives completed in the second semester of the senior year.

[5]Select from MA SC 310, 312, MGT 305, 307, (E L E) 315, 317, 400, 422.

Note: At least 50 percent of the total credits taken in ACCT, ECON, FIN, LAW, MA SC, MGT, and MKT must be taken at Clemson University.

ECONOMICS

A bachelor's degree in Economics provides a thorough understanding of business, society, and public policy and prepares students for a wide range of careers. By combining general education courses and a strong course of study in economics, students can prepare for graduate studies in business, law, or any of the social sciences as well as for careers in business and government.

The Department of Economics offers two undergraduate degree paths. The Bachelor of Arts degree emphasizes language skills and humanities. A broad choice of minors is available for this program. The Bachelor of Arts program requires 30 credit hours economics which may be satisfied by completing ECON 211, 212, and 24 credits of coursework above sophomore level or by completing ECON 200 and 27 credits above the sophomore level. Bachelor of Arts majors must complete ECON 314 and 315. The Bachelor of Science program emphasizes quantitative skills and preparation for careers in business, law, or graduate study in economics. The Bachelor of Science program requires 31 credits of coursework in economics which may be satisfied by completing ECON 211, 212, and 25 credits of coursework above the sophomore level or by completing ECON 200 and 28 credits above the sophomore level. Bachelor of Science majors must complete ECON 405 in addition to 314 and 315.

Minor

Students in Economics curricula may choose, in consultation with their advisors, any University-approved minor. (See page 65.)

Students who wish to combine the curriculum in Economics with secondary school teaching should take the degree in Education with a teaching area in Economics. The courses taken will be those required for teaching certification as specified by the South Carolina Department of Education as well as those required for an Economics major.

Bachelor of Arts

Freshman Year

First Semester
3 - CP SC 120 Intro. to Information Technology
3 - ENGL 101 Composition I
3 - MTHSC 102 Intro. to Mathematical Analysis[1]
4 - Foreign Language Requirement[2]
4 - Science Requirement[3]
17

Second Semester
3 - ENGL 102 Composition II
3 - HIST 173 Western Civilization
3 - MTHSC 207 Multivariable Calculus[1]
4 - Foreign Language Requirement[2]
4 - Science Requirement[3]
17

Sophomore Year

First Semester
3 - ECON 211 Principles of Microeconomics
3 - MTHSC 301 Statistical Theory and Methods I
3 - Foreign Language Requirement[2]
3 - Literature Requirement[4]
4 - Elective
16

Second Semester
3 - ECON 212 Principles of Macroeconomics
3 - Foreign Language Requirement[2]
3 - Literature Requirement[4]
7 - Elective
16

Junior Year

First Semester
3 - ECON 314 Intermediate Microeconomics
3 - SPCH 250 Public Speaking *or*
3 - SPCH 251 Business and Prof. Speaking
3 - Major Requirement[5]
3 - Minor
3 - Writing Intensive Requirement[3]
1 - Elective
16

Second Semester
3 - ECON 315 Intermediate Macroeconomics
3 - Major Requirement[5]
6 - Minor
4 - Elective
16

Senior Year

First Semester
6 - Major Requirement[5]
6 - Minor
3 - Elective
15

Second Semester
6 - Major Requirement[5]
9 - Elective
15

128 Total Semester Hours

[1]MTHSC 106 and 108 may be substituted for MTHSC 102 and 207, respectively, and one or two elective hours.
[2]Two years of the same modern language are required.
[3]See General Education Requirements.
[4]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.
[5]ECON 301, 302, (MGT) 306, and 310 cannot be used to satisfy the Major Requirement.
Note: Students seeking teaching certification will be required to complete more than 128 semester hours.

ECONOMICS

Bachelor of Science

Sophomore Year

First Semester
3 - EX ST 301 Introductory Statistics *or*
  3 - MTHSC 301 Stat. Theory and Methods I
3 - MGT 301 Principles of Management
9 - Option List
1 - Elective
16

Second Semester
3 - ACCT 201 Financial Accounting Concepts
3 - ECON 314 Intermediate Microeconomics
9 - Option List
1 - Elective
16

Junior Year

First Semester
3 - ACCT 202 Managerial Accounting Concepts
3 - FIN 306 Corporation Finance
3 - Minor
3 - Writing Intensive Requirement[1]
3 - Elective
15

Second Semester
3 - ECON 315 Intermediate Macroeconomics
4 - ECON 405 Introduction to Econometrics
3 - Major Requirement[2]
3 - Minor
3 - Elective
16

Senior Year

First Semester
6 - Major Requirement[2]
6 - Minor
6 - Elective
18

Second Semester
6 - Major Requirement[2]
3 - Minor
6 - Elective
15

128 Total Semester Hours

[1]See General Education Requirements.
[2]ECON 301, 302, (MGT) 306, and 310 cannot be used to satisfy the Major Requirement.
Note: At least 50 percent of the total credits taken in ACCT, ECON, FIN, LAW, MA SC, MGT, and MKT must be taken at Clemson University.

FINANCIAL MANAGEMENT

Bachelor of Science

The Bachelor of Science in Financial Management program is designed to develop an understanding of financial markets in the contemporary economy, the operation of financial institutions, and the financial management of business operations. The curriculum prepares students for careers in such areas as banking, corporate financial management, financial planning and services, insurance, and real estate. Governments of all levels also employ finance graduates in many of their divisions. The curriculum also provides excellent preparation for students interested in graduate studies or law school.

The core of the curriculum provides a broad range of subjects with an emphasis on technical and communication skills. Students then have the flexibility to tailor courses to their own needs by choosing emphasis areas that will enhance career preparation in specific areas of finance. Students who complete a specific set of courses are eligible to sit for the certified financial planner (CFP®) examination.

Sophomore Year

First Semester
3 - EX ST 301 Introductory Statistics *or*
  3 - MTHSC 301 Stat. Theory and Methods I
3 - MGT 301 Principles of Management
9 - Option List
1 - Elective
16

Second Semester
3 - ACCT 201 Financial Accounting Concepts
1 - ACCT 204 Accounting Procedures
3 - MA SC 310 Intermediate Business Statistics
9 - Option list
16

Junior Year

First Semester
3 - ACCT 311 Inter. Financial Accounting I
3 - CP SC 220 Microcomputer Applications
3 - FIN 311 Financial Management I
3 - LAW 312 Commercial Law *or*
  3 - LAW 322 Legal Environment of Business
3 - Writing Intensive Requirement[1]
15

Second Semester
3 - ACCT 312 Intermediate Financial Acct. II
3 - FIN 305 Investment Analysis
3 - FIN 307 Principles of Real Estate
3 - FIN 312 Financial Management II
3 - MKT 301 Principles of Marketing
3 - Elective
18

Senior Year

First Semester
3 - ACCT 303 Cost Accounting
3 - FIN 308 Financial Institutions and Markets
9 - Emphasis Area[2]
15

Second Semester
3 - MGT 415 Business Strategy
6 - Emphasis Area[2]
6 - Elective
15

127 Total Semester Hours

[1]See General Education Requirements.
[2]Fifteen credit hours from one of the following emphasis areas. An emphasis area should be selected before the end of the junior year in consultation with the departmental advisor:
Corporate Finance—FIN 402; 404 and 411; plus two courses from FIN 304, 399 (three credits), 406, 408, or two accounting courses. (See Note 3.)
Financial Planning—ACCT 404, 408, FIN 304, 405, 409.
Financial Services—FIN 405, 406, 408, 411, and one course from FIN 304, 399 (three credits), 417.
Real Estate—AP EC 313, FIN 417, LAW 333; one course from FIN 304 or 411; and one course from AP EC 413, FIN 399 (three credits), or LAW 405.

Notes:
1. Financial Management majors are required to have a grade-point ratio of at least 2.0 in all FIN-designated courses to graduate. Only the last grade for courses that are repeated counts for computing this grade-point ratio.
2. At least 50 percent of the total credits taken in ACCT, ECON, FIN, LAW, MA SC, MGT, and MKT must be taken at Clemson University.
3. Accounting courses may be selected from any 300- or 400-level course offered by the School of Accountancy. Credit may not be received for both ACCT 303 and 307.

GRAPHIC COMMUNICATIONS

Bachelor of Science

The Bachelor of Science degree in Graphic Communications prepares students for professional careers in printing, publishing, packaging, and related industries. The core curriculum assures graduates of having the skills and knowledge required by most entry-level jobs. The major requirements allow each student to select courses which enhance career preparation in specific segments of graphic communications. Coursework is heavily oriented around individual laboratory performance which stresses the development of problem-solving skills in a broad cross-section of manufacturing areas. Applications include all major processes and a variety of industry segments, including commercial printing, publishing, package production, specialty printing, and industrial applications of printing technology beyond communications. The most common career opportunities are in printing management, production planning and supervision, and commercial and technical sales.

The Graphic Communications program is designed to be completed in four years (eight semesters and one or two summers). While students must take one internship during a fall or spring semester, one or two summers are typically used to make up for that semester. The department schedules courses in summers for that purpose. Taking a reduced load per term or other circumstances could extend the time to meet graduation requirements.

Policy on Advancement in Graphic Communications

Graphic Communications majors must achieve a C or better in prerequisite G C courses before enrolling in the next level G C course. Registration priority is given to those students for whom the course is a requirement.

Change of Major into Graphic Communications

Students who change majors into Graphic Communications after one or more semesters at Clemson must have a 2.0 minimum cumulative grade-point ratio in courses taken at Clemson or must first have earned a *B* or better in G C 104.

Freshman Year

First Semester

3 - ENGL 101 Composition I
1 - G C 101 Orientation to Graphic Comm.
3 - PSYCH 201 Introduction to Psychology
3 - THRD 180 Intro. to Technical Drawing and Computer-Aided Drafting
4 - Approved Laboratory Science Requirement[1]
3 - Mathematical Sciences Requirement[2]
17

Second Semester

3 - CP SC 120 Intro. to Information Technology
3 - ENGL 102 Composition II
3 - EX ST 301 Introductory Statistics *or*
  3 - MTHSC 203 Elem. Statistical Inference *or*
  3 - MTHSC 301 Stat. Theory and Methods I
4 - G C 104 Graphic Communications I
4 - Approved Laboratory Science Requirement[1]
17

Sophomore Year

First Semester

3 - ACCT 201 Financial Accounting Concepts
3 - G C 207 Graphic Communications II
3 - G C 215 Photo. and Digital Imaging Tech.
3 - MGT 218 Mgt. Personal Computer Appl.
3 - MGT 301 Principles of Management
3 - Major Requirement[3]
18

Second Semester

3 - ACCT 202 Managerial Acct. Concepts
3 - ECON 200 Economic Concepts *or*
  3 - ECON 211 Principles of Microeconomics
3 - G C 245 Graphic Comm. Mechanical Systems
4 - G C 310 Alternative Approaches to Imaging
3 - SPCH 250 Public Speaking *or*
  3 - SPCH 251 Business and Prof. Speaking
16

Summer

0 - CO-OP 101 Cooperative Education[4, 5]
1 - G C 350 Graphic Comm. Internship I[4, 5]
1

Junior Year

First Semester

3 - EN SP 200 Intro. to Environmental Science
2 - G C 405 Package and Specialty Printing
2 - G C 406 Package and Specialty Printing Lab.
3 - MGT 307 Personnel Management *or*
  3 - PSYCH 364 Industrial Psychology
3 - Literature Requirement[6]
3 - Major Requirement[3]
16

Second Semester

3 - ENGL 314 Technical Writing
5 - G C 440 Commercial Printing
3 - G C 446 Ink and Substrates
3 - MKT 301 Principles of Marketing
3 - Humanities Requirement E.2[2]
17

Summer

0 - CO-OP 102 Cooperative Education[4]
1 - G C 450 Graphic Comm. Internship II[4, 7]
1

Senior Year

First Semester

4 - G C 444 Current Developments and Trends in Graphic Communications
3 - THRD 360 Ind. Organizations and Safety
6 - Major Requirement[3]
3 - Elective
16

Second Semester

3 - G C 448 Plan. and Cont. Printing Functions
2 - G C 480 Senior Seminar in Graphic Comm.
4 - Major Requirement[3]
7 - Elective
16

135 Total Semester Hours

[1]Must include a two-semester sequence from chemistry or physics.

[2]See General Education Requirements.

[3]Must be approved by advisor prior to registration. A list of acceptable major requirements is available in the Graphic Communications Office.

[4]One internship must be in a fall or spring semester. (Summer at least 12 weeks; fall/spring 15 week minimum.)

[5]Required before any G C 400-level courses may be taken.

[6]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[7]G C 455 will not substitute for G C 450.

INDUSTRIAL MANAGEMENT

Bachelor of Science

The Bachelor of Science degree in Industrial Management prepares students for management challenges in manufacturing, production planning, inventory control, quality assurance, and service operations. Students receive a broad-based education in business, but particular emphasis is placed on systems, theories, and issues dealing with the production of goods and services. The program is particularly relevant in today's economic environment, where improvements in productivity and quality are essential to meet the growing challenges of foreign próducers. In addition to jobs in manufacturing management, graduates in Industrial Management are sometimes sought for positions as project directors by government agencies and research centers. Financial institutions have found the industrial management graduate well prepared for internal operations management as well as for liaison positions dealing with manufacturing companies as bank customers. The Industrial Management program is accredited by the American Assembly of Collegiate Schools of Business and has received a special commendation for excellence from the South Carolina Commission on Higher Education.

Sophomore Year

First Semester

3 - EX ST 301 Introductory Statistics *or*
  3 - MTHSC 301 Stat. Theory and Methods I
3 - MGT 301 Principles of Management[1]
9 - Option List
1 - Elective
16

Second Semester

3 - ACCT 201 Financial Accounting Concepts
3 - MGT 218 Mgt. Personal Computer Appl.
9 - Option List
1 - Elective
16

Junior Year

First Semester

3 - ACCT 202 Managerial Accounting Concepts
3 - LAW 322 Legal Environment of Business
3 - MA SC 310 Intermediate Business Statistics[1]
3 - MKT 301 Principles of Marketing
3 - Writing Intensive Requirement[2]
2 - Elective
17

Second Semester

3 - ACCT 307 Managerial Accounting
3 - FIN 306 Corporation Finance
3 - MA SC 312 Decision Models for Mgt.[1]
3 - MGT 305 Economics of Transportation[1] *or*
  3 - MGT 317 Logistics Management[1]
3 - MGT 390 Operations Management[1]
2 - Elective
17

Senior Year

First Semester

3 - ECON (MGT) 306 Managerial Economics[1]
3 - MA SC 414 Statistical Analysis[1]
3 - MGT 307 Personnel Management[1]
3 - MGT 402 Operations Planning and Control[1]
3 - MGT 418 Management Information Systems[1]
2 - Elective
17

Second Semester
3 - MGT 400 Mgt. of Organizational Behavior[1]
3 - MGT 404 Adv. Statistical Quality Control[1]
3 - MGT 408 Design of Production Systems[1]
3 - MGT 415 Business Strategy[1]
3 - MGT 423 International Business Mgt.[1]
2 - Elective
17

132 Total Semester Hours

[1]Grade of C or higher in this course is required for graduation.

[2]See General Education Requirements.

Note: At least 50 percent of the total credits taken in ACCT, ECON, FIN, LAW, MA SC, MGT, and MKT must be taken at Clemson University.

MANAGEMENT

Bachelor of Science

The Bachelor of Science degree in Management prepares students for careers as professional managers in corporations, governmental organizations, and small businesses. In addition, the program provides a foundation for graduates who wish to pursue advanced degrees in business and public administration, law, and the social sciences.

The curriculum gives students a broad exposure to the functional areas of business and allows each to select an emphasis area in a subject that is germane to individual career interests. The Management curriculum provides an examination of the social, legal, political, and economic environments in which organizations must operate; an understanding of the functional areas of business and their interrelationships; and a knowledge of behavioral science, applied statistics, and mathematics as they relate to organizational problem solving. The program is accredited by the American Assembly of Collegiate Schools of Business.

Sophomore Year

First Semester
3 - EX ST 301 Introductory Statistics *or*
    3 - MTHSC 301 Stat. Theory and Methods I
3 - MGT 301 Principles of Management[1]
9 - Option List
1 - Elective
16

Second Semester
3 - ACCT 201 Financial Accounting Concepts
3 - MGT 218 Mgt. Personal Computer Appl.
9 - Option List
1 - Elective
16

Junior Year

First Semester
3 - ACCT 202 Managerial Accounting Concepts
3 - LAW 322 Legal Environment of Business
3 - MA SC 310 Intermediate Business Statistics[1]
3 - MKT 301 Principles of Marketing
3 - Writing Intensive Requirement[2]
2 - Elective
17

Second Semester
3 - ACCT 307 Managerial Accounting
3 - FIN 306 Corporation Finance
3 - MA SC 312 Decision Models for Management[1]
3 - MGT 307 Personnel Management[1]
3 - Economics Requirement[3]
2 - Elective
17

Senior Year

First Semester
3 - MGT 390 Operations Management[1]
3 - MGT 400 Mgt. of Organizational Behavior[1]
3 - MGT 418 Management Information Systems[1]
6 - Management Requirement[1, 4]
2 - Elective
17

Second Semester
3 - MGT 415 Business Strategy[1]
3 - MGT 423 International Business Mgt.[1]
6 - Management Requirement[1, 4]
3 - Operations Management Requirement[1, 5]
2 - Elective
17

132 Total Semester Hours

[1]Grade of C or higher in this course is required for graduation.

[2]See General Education Requirements.

[3]Select from ECON 301, 308, 309, 314.

[4]Twelve semester hours beyond required courses selected from 300- and 400-level MGT and MA SC courses. In lieu of the Management Requirement, students may select a minor approved by the advisor and Management Department Chair or complete 12 hours from one of the following tracks.

Entrepreneurship—E L E (MKT) 314, (MGT) 315, plus two courses from E L E 301, (ECON) 321, (PO SC, PSYCH, SOC) 356, 401.

Human Resources Management (See advisor before selecting courses.)—ECON 301, 308, LAW 401, MGT 416, 425, 431, 435, PSYCH 364, 368, 435.

International Management—ECON 310, FIN 411, LAW 420, plus one course from L&IT 401, MGT 424, 444 (three hours), MKT 427, PO SC 373.

Transportation and Logistics—MGT 305, 317, 424, plus one course from MGT 426, 427, 430, 490.

[5]Select from MGT 402, 404, 408, 411, 427.

Note: At least 50 percent of the total credits taken in ACCT, ECON, FIN, LAW, MA SC, MGT, and MKT must be taken at Clemson University.

MARKETING

Bachelor of Science

The Bachelor of Science degree program in Marketing develops an understanding of various aspects of marketing. The curriculum prepares students for professional marketing careers in industry, government, or the non-profit sector. Graduates are also well prepared for entrance into the Master of Business Administration, law, or other graduate programs. For students who want a general perspective of marketing, the curriculum provides a broad range of subjects with the flexibility to tailor courses by choosing areas that will enhance career preparation in various areas of marketing. Subjects include promotional strategy, professional selling, sales management, public and nonprofit marketing, entrepreneurship, marketing research, product management, marketing management, and international marketing. Emphasis areas in services marketing, sport marketing, and technical marketing are available to students who seek to specialize. The Marketing curriculum, whether approached from a general or specialized perspective, provides the conceptual, quantitative, and analytical skills necessary for students to function in a dynamic business environment. The Marketing degree is accredited by the American Assembly of Collegiate Schools of Business (AACSB).

Sophomore Year

First Semester
3 - EX ST 301 Introductory Statistics *or*
    3 - MTHSC 301 Stat. Theory and Methods I
3 - MGT 301 Principles of Management[1]
9 - Option List
1 - Elective
16

Second Semester
3 - ACCT 201 Financial Accounting Concepts
3 - MA SC 310 Intermediate Business Statistics
9 - Option List
1 - Elective
16

Junior Year

First Semester
3 - ACCT 202 Managerial Accounting Concepts
3 - LAW 312 Commercial Law *or*
    3 - LAW 322 Legal Environment of Business
3 - MKT 301 Principles of Marketing
3 - Support Course Requirement[2]
3 - Writing Intensive Requirement[3]
15

Second Semester
3 - FIN 306 Corporation Finance
3 - MKT 302 Consumer Behavior
3 - MKT 431 Marketing Research
3 - Emphasis Area[4]
3 - Support Course Requirement[2]
15

Senior Year

First Semester
3 - MGT 415 Business Strategy
3 - MKT 427 International Marketing
3 - Emphasis Area[4]
3 - Support Course Requirement[2]
4 - Elective
16

Second Semester
3 - MKT 450 Strategic Marketing Management
3 - Emphasis Area[4]
6 - Support Course Requirement[2]
4 - Elective
16

126 Total Semester Hours

[1]Grade of C or higher in this course is required for graduation.

[2]Chosen jointly by the student and the advisor. These must support the emphasis area selected by the student. Certain minors may be used to satisfy the support courses requirement. See advisor for details.

[3]See General Education Requirements.

[4]Select one of the following emphasis areas:

General Marketing—MKT 420 or 423; 425, 426, 428, or 429; and any one additional MKT course.

Services Marketing—MKT 420 or 423; 425, 426, or 429; and 428.

Sport Marketing—MKT 321; 420 or 423; and 428.

Technical Marketing—MKT 420; 423, 424, 428, or 430; and 426.

Notes:

1. Marketing majors are required to have a grade-point ratio of at least 2.0 in all MKT-designated courses to graduate. Only the last grade for courses that are repeated counts in computing this grade-point ratio.
2. At least 50 percent of the total credit hours taken in ACCT, ECON, FIN, LAW, MA SC, MGT, and MKT must be taken at Clemson University.

POLITICAL SCIENCE

The Department of Political Science offers two degree programs: a bachelor of arts and a bachelor of science. Both require a total of 130 credit hours. Both prepare students for a wide range of graduate programs and career opportunities. The bachelor of arts program is specifically recommended for students interested in communication and language arts. The bachelor of science program is recommended for those with an aptitude in mathematics and an interest in public policy analysis or other fields requiring advanced quantitative skills. Both programs are equally suitable as preparation for law school. Note that the bachelor of arts degree requires a minor, and the bachelor of science degree requires a field of concentration and, depending on the concentration, requires or allows a minor.

Bachelor of Arts

The requirements for a Bachelor of Arts in Political Science consist of PO SC 101, 102 or 104, 250 and at least 21 additional credit hours of political science, including at least one course from four of the following five fields:

American Government—PO SC 403, 405, 432, 442
Comparative Politics—PO SC 371, 373, 471, 472, 476, 477, 478
International Relations—PO SC 361, 362, 363, 428, 465
Political Theory—PO SC 451, 452, 453
Public Policy and Public Administration—PO SC 302, 321, 421, 423, 424

The student's elective hours in political science are chosen with the consent and advice of the departmental advisor to ensure an appropriate balance of breadth and specialization within the field of political science. In addition to the courses listed above, the department offers a wide range of specialized courses in each of the subfields of the political science discipline.

Note: No more than six hours credit from PO SC 310, 311, and 312 may be counted toward any degree; no more than three hours credit from these courses may be applied to the requirements of a Political Science major.

Freshman Year

First Semester
3 - ENGL 101 Composition I
3 - MTHSC 101 Introduction to Probability[1]
3 - PO SC 101 Introduction to American Politics
4 - Foreign Language Requirement[2]
4 - Science Requirement[3]
17

Second Semester
3 - ENGL 102 Composition II
3 - MTHSC 102 Intro. to Mathematical Analysis[1]
3 - PO SC 102 Introduction to Global Issues
4 - Foreign Language Requirement[2]
4 - Science Requirement[3]
17

Sophomore Year

First Semester
3 - HIST 172 Western Civilization
3 - PO SC 250 Introduction to Political Science
3 - Computer Skills Requirement[3]
3 - Foreign Language Requirement[2]
3 - Literature Requirement[4]
3 - Oral Communication Requirement[3]
18

Second Semester
3 - HIST 173 Western Civilization
3 - Foreign Language Requirement[2]
3 - Literature Requirement[4]
6 - Major and Minor Areas[5]
3 - Writing Intensive Requirement[3]
18

Junior Year

First Semester
3 - ECON 211 Principles of Microeconomics
3 - Advanced Humanities Requirement[6]
6 - Major and Minor Areas[5]
3 - Elective
15

Second Semester
3 - ECON 212 Principles of Macroeconomics
3 - Advanced Humanities Requirement[6]
6 - Major and Minor Areas[5]
3 - Elective
15

Senior Year

First Semester
3 - Advanced Humanities Requirement[6]
6 - Major and Minor Areas[5]
6 - Elective
15

Second Semester
9 - Major and Minor Areas[5]
6 - Elective
15

130 Total Semester Hours

[1]Students may pursue alternate sequences consistent with General Education Requirements. Examples include MTHSC 101 and 106 or 203; 102 and 207; 106 and 108, 207, or 301.

[2]The equivalent of two years (through 202) of the same modern language is required.

[3]See General Education Requirements.

[4]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[5]See list of approved minors on page 65.

[6]Advanced humanities are courses numbered 300 or higher (A A H 210, MUSIC 210, THEA 210 excepted). The humanities for this purpose include art and architectural history, English (except 304, 312, 314, 316, 331, 333, 334, 335, 485, 490, 495), languages, music, philosophy, religion, speech (except 362 and 364), theatre (except 377, 487, and 497), and women's studies, as well as courses entitled Humanities.

POLITICAL SCIENCE

Bachelor of Science

Freshman Year

First Semester
3 - ENGL 101 Composition I
3 - MTHSC 102 Intro. to Mathematical Analysis[1]
3 - PO SC 101 Introduction to American Politics
4 - Foreign Language Requirement[2]
4 - Science Requirement[3]
17

Second Semester
3 - ENGL 102 Composition II
3 - MTHSC 207 Multivariable Calculus[1]
3 - PO SC 102 Introduction to Global Issues *or*
3 - PO SC 104 Intro. to Comparative Politics
4 - Foreign Language Requirement[2]
4 - Science Requirement[3]
17

Sophomore Year

First Semester
3 - ECON 211 Principles of Microeconomics
3 - MTHSC 301 Statistical Theory and Methods I
3 - PO SC 250 Introduction to Political Science
3 - Foreign Language Requirement[2] *or*
3 - PHIL 102 Introduction to Logic
3 - Humanities Requirement E.1[3]
3 - Major Requirement[4]
18

Second Semester
3 - ECON 212 Principles of Macroeconomics
3 - CP SC 120 Intro. to Information Technology
3 - Foreign Language Requirement[2] *or*
3 - Elective
3 - Oral Communication Requirement[3]
3 - Political Science Requirement[5]
3 - Writing Intensive Requirement[3]
18

[1]MTHSC 106 and 108 may be substituted.

[2]The equivalent of one year (through 102) of the same modern foreign language is required. Students pursuing an international concentration must complete the equivalent of two years (through 202) of the same modern foreign language and may substitute a 200-level language class for PHIL 102.

[3]See General Education Requirements.

[4]See advisor.

[5]Any 300–400-level course in political science.

AMERICAN POLITICS/ INTERNATIONAL POLITICS CONCENTRATION

Junior Year

First Semester
3 - PO SC 341 Quantitative Methods in Pol. Sci.
3 - Advanced Political Science Requirement[1]
3 - Minor[2]
6 - Elective
15

Second Semester
3 - Advanced Political Science Requirement[1]
3 - Minor[2]
9 - Elective
15

Senior Year

First Semester
3 - Advanced Political Science Requirement[1]
6 - Minor[2]
6 - Elective
15

Second Semester
3 - Advanced Political Science Requirement[1]
6 - Minor[2]
6 - Elective
15

130 Total Semester Hours

[1]See advisor.
[2]See page 65 for approved minors.

POLITICAL ECONOMY/ INTERNATIONAL POLITICAL ECONOMY CONCENTRATIONS

Junior Year

First Semester
3 - ECON 314 Intermediate Microeconomics
4 - ECON 405 Introduction to Econometrics
3 - Advanced Political Science Requirement[1]
5 - Elective
15

Second Semester
3 - ECON 315 Intermediate Macroeconomics
3 - Advanced Political Science Requirement[1]
9 - Elective
15

Senior Year

First Semester
3 - ECON 419 Economics of Defense *or*
3 - ECON 420 Public Sector Economics[2]
6 - Advanced Political Science Requirement[1]
6 - Elective
15

Second Semester
3 - Advanced Economics Requirement[3]
3 - Advanced Political Science Requirement[1]
9 - Elective
15

130 Total Semester Hours

[1]See advisor.
[2]International Concentration students must substitute ECON 404 or 413.
[3]Any 300- or 400-level course in economics.

PUBLIC ADMINISTRATION/ INTERNATIONAL PUBLIC ADMINISTRATION CONCENTRATIONS

Junior Year

First Semester
3 - PO SC 302 State and Local Government *or*
3 - PO SC 424 Federalism and Intergovernmnental Relations[1]
3 - PO SC 321 General Public Administration
3 - PO SC 341 Quantitative Methods in Pol. Sci.
6 - Elective
15

Second Semester
3 - Advanced Political Science Requirement[2]
6 - Public Administration Requirement[2]
6 - Elective
15

Senior Year

First Semester
3 - PO SC 430 Public Policy Evaluation
6 - Public Administration Requirement[2]
6 - Elective
15

Second Semester
6 - Public Administration Requirement[2]
9 - Elective
15

130 Total Semester Hours

[1]International Concentration students must substitute PO SC 363, 428, or 429.
[2]See advisor.

PUBLIC POLICY/ INTERNATIONAL PUBLIC POLICY CONCENTRATIONS

Junior Year

First Semester
3 - PO SC 341 Quantitative Methods in Pol. Sci.
3 - PO SC 421 Public Policy Processes
3 - Advanced Political Science Requirement[1]
6 - Elective
15

Second Semester
3 - Advanced Political Science Requirement[1]
6 - Public Policy Requirement[1]
6 - Elective
15

Senior Year

First Semester
3 - PO SC 430 Public Policy Evaluation
6 - Public Policy Requirement[1]
6 - Elective
15

Second Semester
6 - Public Policy Requirement[1]
9 - Elective
15

130 Total Semester Hours

[1]See advisor.

PSYCHOLOGY

Psychology is the study of human and animal behavior and the biological, psychological, and social processes related to that behavior. The Bachelor's degree in Psychology is designed to prepare students for a variety of professional careers related to human resources, personnel, counseling, and other people-oriented positions in human services, business, and industry. Additionally, the Bachelor's degree provides excellent preparation for graduate training in such areas as clinical, counseling, industrial, experimental, cognitive, social, biological, health, developmental, and school psychology. The program also provides excellent preparation for students who intend to pursue professional training in medicine, physical or occupational therapy, dentistry, pharmacy, veterinary science, or law. For more information, visit our Web site at hubcap.clemson.edu/psych/psych.html.

Bachelor of Arts

The requirements for the Bachelor of Arts program consist of PSYCH 201, 309, 310, and 24 additional credits in psychology. These additional credits must include the following:

Two courses from the **Biological and Cognitive** menu: PSYCH 324, 333, 422.
One course from each of the following menus:
Applied—PSYCH 355, 364, 368, 375, 435, 457, 480, 483, 488
Individuals and Groups—PSYCH 340, 352, 370
Laboratory—PSYCH 325, 334, 423, 471, H490, 493, 495, 496, 497

At least six credits must be from 400-level psychology courses, with at least three of those credits in courses numbered between 400 and 489. BIOSC 470 may be taken in lieu of one 300- or 400-level elective psychology course. Students should consult their advisors for other degree requirements and course recommendations.

Freshman Year

First Semester
3 - ENGL 101 Composition I
3 - PSYCH 201 Introduction to Psychology
4 - Foreign Language Requirement[1]
3 - Mathematical Sciences Requirement[2]
4 - Science Requirement[3]
17

Second Semester
3 - CP SC 120 Intro. to Information Technology
3 - ENGL 102 Composition II
4 - Foreign Language Requirement[1]
3 - Mathematical Sciences Requirement[2]
4 - Science Requirement[3]
17

Sophomore Year

First Semester
4 - PSYCH 309 Intro. Experimental Psychology
3 - Cultural Awareness Requirement[4]
3 - Foreign Language Requirement[1]
3 - Humanities Requirement E.1[3]
3 - Elective
16

Second Semester
4 - PSYCH 310 Adv. Experimental Psychology
3 - Cultural Awareness Requirement[4]
3 - Foreign Language Requirement[1]
3 - Humanities Requirement E.2[3]
3 - Elective
16

Junior Year

First Semester
6 - Major Area
3 - Minor Area[5]
3 - Social Science Requirement[6]
3 - Writing Intensive Requirement[3]
2 - Elective
17

Second Semester
3 - Humanities Requirement[7]
3 - Major Area
3 - Minor Area[5]
3 - Oral Communication Requirement[3]
3 - Elective
15

Senior Year

First Semester
9 - Major Area
6 - Minor Area[5]
15

Second Semester
6 - Major Area
6 - Minor Area[5]
3 - Elective
15

128 Total Semester Hours

[1]The equivalent of two years (through 202) of the same modern language is required.

[2]Recommended sequences: MTHSC 101 and 203, or MTHSC 102 and 207. Other approved sequences: MTHSC 106 and 108; 106 and 301; 106 and 207; or 102 and 106.

[3]See General Education Requirements.

[4]See department approved listing. Courses used to fulfill the Humanities Requirement, Social Science Requirement, or Major Area cannot be used to meet this requirement.

[5]Any minor which has been approved by the University and listed on page 65.

[6]See General Education Requirements. Social science other than psychology.

[7]Humanities courses numbered 300 or higher. The humanities for this purpose include art and architectural history, English (except 304, 312, 314, 316, 331, 333, 334, 335, 485, 490, 495), languages, music, philosophy, religion, speech (except 362 and 364), theatre (except 377, 487, and 497), and women's studies, as well as courses entitled Humanities. The following 100–200 level courses are also acceptable: A A H 210, C H S H203, MUSIC 210, PHIL 101, 102, 103, REL 101, 102, THEA 210.

PSYCHOLOGY

Bachelor of Science

The requirements for the Bachelor of Science program consist of PSYCH 201, 309, 310, and 24 additional credits in psychology as follows:

Biological and Cognitive menu—two courses from PSYCH 324, 333, 422
One course from each of the following menus:
Applied—PSYCH 355, 364, 368, 375, 435, 457, 480, 483, 488
Foundations of Science—G W 402, PHIL 326, 327, 425, PSYCH 415
Individuals and Groups—PSYCH 340, 352, 370
Laboratory—PSYCH 325, 334, 423, 471, H490, 493, 495, 496, 497

At least six credits must be from 400-level psychology courses, with at least three of those credits from courses numbered between 400 and 489. BIOSC 470 may be taken in lieu of one 300- or 400-level elective psychology course. Students should consult their advisors for other degree requirements and course recommendations.

Freshman Year

First Semester
4 - BIOL 103 General Biology I[1]
3 - CP SC 120 Intro. to Information Technology
3 - ENGL 101 Composition I
3 - PSYCH 201 Introduction to Psychology
3 - Mathematical Sciences Requirement[2]
16

Second Semester
4 - BIOL 104 General Biology II[1]
3 - ENGL 102 Composition II
3 - PHIL 102 Introduction to Logic
3 - Cultural Awareness Requirement[3]
3 - Mathematical Sciences Requirement[2]
16

Sophomore Year

First Semester
4 - PSYCH 309 Intro. Experimental Psychology
3 - Cultural Awareness Requirement[3]
3 - Humanities Requirement E.1[4]
3 - Physical or Natural Science Requirement[5]
3 - Elective
16

Second Semester
4 - PSYCH 310 Adv. Experimental Psychology
3 - Humanities Requirement[6]
3 - Mathematical Sciences Requirement[7]
3 - Physical or Natural Science Requirement[5]
3 - Social Science Requirement[8]
16

Junior Year

First Semester
3 - ENGL 304 Business Writing *or*
3 - ENGL 312 Advanced Expository Writing *or*
3 - ENGL 314 Technical Writing
6 - Major Area
3 - Minor Area[9]
3 - Physical or Natural Science Requirement[5]
2 - Elective
17

Second Semester
3 - SPCH 150 Intro. to Speech Communication *or*
3 - SPCH 250 Public Speaking *or*
3 - SPCH 251 Business and Prof. Speaking
3 - Major Area
3 - Minor Area[9]
3 - Social Science Requirement[8]
3 - Elective
15

Senior Year

First Semester
9 - Major Area
6 - Minor Area[9]
2 - Elective
17

Second Semester
6 - Major Area
6 - Minor Area[9]
3 - Elective
15

128 Total Semester Hours

[1]Biology 110/111 may be substituted. In this case, the extra two credit hours will be counted as electives.

[2]Recommended sequence: MTHSC 101 and 203, or 102 and 207, or 106 and 108.

[3]See department approved listing. Courses used to fulfill the Humanities Requirement, Social Science Requirement, or Major Area cannot be used to meet this requirement.

[4]See General Education Requirements.

[5]Six of the nine hours must come from a two-semester sequence in a physical or natural science other than biology.

[6]Humanities courses numbered 300 or higher. The humanities for this purpose include art and architectural history, English (except 304, 312, 314, 316, 331, 333, 334, 335, 485, 490, 495), languages, music, philosophy, religion, speech (except 362 and 364), theatre (except 377, 487, and 497), and women's studies, as well as courses entitled Humanities. The following 100–200-level courses are also acceptable: A A H 210, C H S H203, MUSIC 210, THEA 210, PHIL 101, 103, REL 101, 102.

[7]MTHSC 102, 106, or 119 for those who have completed MTHSC 101 and 203. MTHSC 119, 129, 206, 210, 301, 311, or 405 for those who have completed a sequence including MTHSC 102 or 106.

[8]See General Education Requirements. Social science other than psychology.

[9]Any minor approved by the University and listed on page 65.

SOCIOLOGY

The Sociology major offers two degree programs: a bachelor of arts and a bachelor of science. The Bachelor's degree in Sociology prepares students for a variety of professional careers related to human resources, management, public relations, social services, criminal justice, health services, social research, and other people-oriented positions in the public and private sector. In addition, the Bachelor's degree provides excellent preparation for graduate training in sociology, social services, law, and business. Both degrees require a total of 128 semesters hours as identified below. Courses used to fulfill Humanities and Mathematics or Science Requirements may be used to fulfill minor requirements.

Emphasis Areas in Sociology

General Sociology—One course from SOC 311, 414, 440; one course from SOC 330, 331, 480; one course from SOC 235, 350, 435; and nine credits from all courses offered in sociology or anthropology not already taken to fulfill requirements.

Social Services Sociology—SOC 380, 414, 484, (R S) 495; one course from SOC 392, 394, 396, 397, 464, 480; and three credits from all courses offered in sociology or anthropology not already taken to fulfill requirements.

Criminal Justice Sociology—SOC 390, (R S) 495; either SOC 392 or 393; one course from PO SC 434, SOC 414, 491, 493; one course from SOC 391, 396, 397; and three credits from all courses offered in sociology and anthropology not already taken to fulfill requirements.

At least 12 of the total credits must be from 400-level sociology, rural sociology, and/or anthropology courses; no more than nine credit hours may be taken in courses at the 100 or 200 level, except with approval of the department chair. Additional electives are added to meet the minimum of 128 hours required for graduation.

Substance Abuse Certificate Program

The Substance Abuse Certificate Program is an interdisciplinary program drawn from courses in sociology, education, health, and psychology. Students study the causes, consequences, prevention, and treatment of substance abuse. They also study delivery systems and policy issues associated with legal and illicit substances. Through a field placement, students come fact-to-face with the problem and gain practical experience to prepare them to enter the field of practicing specialists. The program prepares students for state credentialing as substance abuse specialists. The credential requires knowledge in theory and treatment of substance abuse problems.

Completion of the Substance Abuse Certificate Program requires ED C 234, HLTH 301, PSYCH 375, SOC 380, 396, 397, (R S) 495.

Bachelor of Arts

Freshman Year

First Semester
3 - ENGL 101 Composition I
3 - MTHSC 101 Introduction to Probability[1]
3 - SOC 201 Introduction to Sociology
4 - Foreign Language Requirement[2]
4 - Science Requirement[3]
17

Second Semester
3 - ENGL 102 Composition II
3 - MTHSC 203 Elementary Statistical Inference[1]
4 - Foreign Language Requirement[2]
4 - Science Requirement[3]
3 - Elective
17

Sophomore Year

First Semester
3 - CP SC 120 Intro. to Information Technology
3 - Foreign Language Requirement[2]
3 - Humanities Requirement E.1[3]
3 - Oral Communication Requirement[3]
3 - Elective
15

Second Semester
3 - Foreign Language Requirement[2]
3 - Humanities Requirement E.2[3]
6 - Minor[4]
3 - Elective
15

Junior Year

First Semester
4 - SOC (R S) 303 Methods of Social Research I
3 - Advanced Humanities Requirement[5]
3 - Emphasis Area[6]
3 - Global Awareness Requirement[7]
3 - Writing Intensive Requirement[3]
16

Second Semester
3 - Advanced Humanities Requirement[5]
6 - Emphasis Area[6]
6 - Minor[4]
3 - Elective
18

Senior Year

First Semester
3 - Advanced Humanities Requirement[5]
6 - Emphasis Area[6]
3 - Stratification Requirement[8]
3 - Elective
15

Second Semester
3 - SOC 404 Sociological Theory
3 - Advanced Humanities Requirement[5]
3 - Emphasis Area[6]
3 - Minor[4]
3 - Elective
15

128 Total Semester Hours

[1]MTHSC 106 and 301 may be substituted.

[2]The equivalent of two years (through 202) in the same foreign language is required.

[3]See General Education Requirements.

[4]See page 65 for approved minors.

[5]Humanities courses numbered 300 or higher (A A H 210, MUSIC 210, THEA 210 excepted). The humanities for this purpose include art and architectural history, English (except 304, 312, 314, 316, 331, 333, 334, 335, 485, 490, 495), languages, music, philosophy, religion, speech (except 362 and 364), theatre (except 377, 487, 497), and women's studies, as well as courses entitled Humanities.

[6]See advisor.

[7]Select from ANTH 301, SOC 312, 433.

[8]Select from SOC 460, 461, 464.

SOCIOLOGY

Bachelor of Science

Freshman Year

First Semester
3 - ENGL 101 Composition I
3 - MTHSC 101 Introduction to Probability[1]
3 - SOC 201 Introduction to Sociology
3 - Humanities Requirement E.2[2]
4 - Science Requirement[2]
16

Second Semester
3 - ENGL 102 Composition II
3 - MTHSC 203 Elementary Statistical Inference[1]
3 - Oral Communication Requirement[2]
4 - Science Requirement[2]
3 - Elective
16

Sophomore Year

First Semester
3 - CP SC 120 Intro. to Information Technology
3 - Humanities Requirement E.1[2]
6 - Mathematics or Science Requirement[3]
3 - Elective
15

Second Semester
4 - Mathematics or Science Requirement[3]
6 - Minor[4]
5 - Elective
15

Junior Year

First Semester
3 - ENGL 314 Technical Writing
4 - SOC (R S) 303 Methods of Social Research I
3 - Emphasis Area[5]
3 - Global Awareness Requirement[6]
3 - Philosophy Requirement[7]
16

Second Semester
3 - Advanced Humanities Requirement[8]
6 - Emphasis Area[5]
6 - Minor[4]
3 - Elective
18

Senior Year

First Semester
3 - ANTH 351 Physical Anthropology[9]
3 - Emphasis Area[5]
5 - Mathematics or Science Requirement[3]
3 - Stratification Requirement[10]
3 - Elective
17

Second Semester
3 - SOC 404 Sociological Theory
6 - Emphasis Area[5]
3 - Minor[4]
3 - Elective
15

128 Total Semester Hours

[1]MTHSC 106 and 301 may be substituted.

[2]See General Education Requirements.

[3]See advisor. At least six of the 15 hours must be at the 300-level or above.

[4]See page 65 for approved minors.

[5]See advisor.

[6]Select from ANTH 301, SOC 312, 433.

[7]Select from PHIL 323, 325, 326, 327, 355, 360.

[8]Humanities courses numbered 300 or higher (A A H 210, MUSIC 210, THEA 210 excepted). The humanities for this purpose include art and architectural history, English (except 304, 312, 314, 316, 331, 333, 334, 335, 485, 490, 495), languages, music, philosophy, religion, speech (except 362 and 364), theatre (except 377, 487, 497), and women's studies, as well as courses entitled Humanities.

[9]May not be used to fill the 34 credits for the major.

[10]Select from SOC 460, 461, 464.

MINORS

Following are minors acceptable for students in the College of Business and Behavioral Science. Students cannot major and minor in the same field or acquire a minor that is not allowed by the degree program.

Accounting
Adult/Extension Education
Aerospace Studies
African American Studies
Agricultural Business Management
Agricultural Mechanization and Business
Anthropology
Aquaculture, Fisheries, and Wildlife Biology
Beef Cattle Production
Biochemistry
Bioengineering
Biological Sciences
Business Administration—*not open to Accounting, BS Economics, Financial Management, Industrial Management, Management, or Marketing majors*
Chemistry
Cluster
Communications
Computer Science
Crop and Soil Environmental Science
Early Intervention Specialist—*open to Psychology and Sociology majors only*
Economics
Elementary Education—*not open to Graphic Communications majors*
English
Entomology
Entrepreneurship—*not open to Accounting, BS Economics, Financial Management, Industrial Management, Management, or Marketing majors*
Environmental Engineering
Environmental Science and Policy
Film Studies
Financial Management
Fine Arts
Food Science
Forest Products
Forest Resource Management
Geography
Geology
Great Works
Health Science
History
Horse Production
Horticulture
Human Resource Management—*not open to Industrial Management or Management majors*
International Politics—*not open to Political Science majors*
Legal Studies
Management—*not open to Industrial Management majors*
Marketing
Mathematical Sciences
Microbiology
Military Science
Modern Languages
Music
Natural Resource Economics
Operations Management—*not open to Industrial Management or Management majors*
Packaging Science
Parks, Recreation, and Tourism Management
Philosophy
Physics
Plant Pathology
Political Science
Poultry Science
Psychology
Public Policy—*not open to Political Science or Sociology majors*
Religion
Science and Technology in Society
Screenwriting
Secondary Education—*not open to Graphic Communications majors*
Sociology
Spanish-American Area Studies
Speech and Communication Studies
Textiles
Theatre
Urban Forestry
Women's Studies
Writing

See pages 30-33 for details.

COLLEGE OF ENGINEERING AND SCIENCE

The College of Engineering and Science offers a broad range of rigorous and stimulating baccalaureate programs which provide unexcelled educational opportunities. The innovative combination of engineering and science disciplines which comprise the College facilitates study and research in fields transcending the traditional disciplines. Students enjoy close interaction with a distinguished faculty committed to excellence in undergraduate education as well as in research. The College Web site at www.ces.clemson.edu has additional information on the College and its programs.

Minors

Engineering and science students can complement their majors by selecting minor concentrations of study. Available minors include Bioengineering, Environmental Engineering, International Engineering and Science, one in each of the science majors, and in Textiles. (See page 82.)

International Programs

As the world economy becomes ever more tightly integrated, it is increasingly important that engineering and science students prepare themselves for this global environment. The College offers a minor in International Engineering and Science coupled with several programs that provide opportunities for students to gain international experience. These include EPIC (an international co-op program) and study abroad options. In addition, engineering and science students are encouraged to pursue study of a foreign language. Information on international programs is available in the Undergraduate Studies Office (107 Riggs Hall) and on our Web site at www.ces.clemson.edu/global.

ENGINEERING PROGRAMS

The professional Bachelor of Science engineering degrees in Biosystems Engineering, Ceramic and Materials Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Industrial Engineering, and Mechanical Engineering are each accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The Biosystems Engineering program is administered jointly with the College of Agriculture, Forestry, and Life Sciences.

All engineering programs have the common goal of producing engineering graduates who are able to
- apply knowledge of math, science, and engineering;
- formulate and solve engineering problems;
- design and conduct experiments and analyze data;
- design systems or components to meet needs;
- function on multidisciplinary teams;
- communicate effectively;
- conduct themselves professionally and ethically;
- appreciate engineering's global/societal context;
- understand contemporary engineering issues;
- apply modern engineering methods and tools;
- appreciate the need for life-long learning.

Each engineering program has additional objectives specific to the discipline. All prepare students for a wide range of career opportunities and provide sound preparation for graduate study. Each curriculum provides opportunities for students to pursue individual areas of interest.

Admission Requirements

The University admission requirements are given under the section entitled *Admission*. Engineering applicants are strongly advised to include the following in their high school program:

Mathematics—Four units, including geometry, trigonometry, and introductory calculus.

Laboratory Science—At least three units, including both chemistry and physics.

Computing—At least one unit, including introduction to a programming language. Applicants should have good keyboarding skills.

General Engineering Program

The General Engineering Program provides students with an opportunity to explore various engineering fields while gaining a sound academic preparation for engineering study. All engineering students must complete a common curriculum for the freshman year before being admitted into an engineering baccalaureate degree program. All new engineering students (including transfer students) are admitted into General Engineering until all classes in the freshman curriculum are satisfactorily completed. Students with no programming experience who plan to enter Computer Engineering should consult an advisor about taking CP SC 111 or 101 as an elective in the first semester. For additional information about General Engineering, visit www.ces.clemson.edu/ge.

Freshman Curriculum

First Semester

4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
1 - ENGR 101 Introduction to Engineering
4 - MTHSC 106 Calculus of One Variable I
3 - Humanities/Social Science Requirement[1]
15

Second Semester

4 - CH 102 General Chemistry
3 - ENGL 102 Composition II
3 - ENGR 120 Engineering Problem Solving and Design
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
17

[1]History 122 is strongly recommended. See policy on Humanities and Social Sciences for Engineering Curricula for other acceptable courses.

Admission into Engineering Degree Programs

To transfer into an engineering degree program, a student must have a 2.0 minimum cumulative grade-point ratio in courses taken at Clemson and have completed the General Engineering freshman curriculum. Students entering General Engineering after May 15, 1996, must also have a C or better in each course in the freshman curriculum except the humanities/social science requirement.

A change-of-major request should be initiated by the student prior to the registration period during the semester in which he/she expects to complete the freshman curriculum. Students who fail to meet the requirements for admission into a degree granting program may remain in General Engineering until those requirements are met; however, the only engineering courses in which they can enroll are C M E 210, E G 209, E M 201 and 202, and ENGR 101 and 120. Students transferring into an engineering degree program will follow the curriculum in effect at the time of transfer.

Humanities and Social Sciences for Engineering Curricula

Engineers have an obligation to practice their profession in a socially responsible manner. The education of engineers must prepare them for these responsibilities and make them aware of the constraints imposed by societal factors. Thus, an important component of the engineering curricula is a program of study of the humanities and social sciences in which students are required to achieve depth of knowledge in one or two areas rather than simply taking a collection of introductory courses.

This program of study must include a minimum of 15 credits selected so as to satisfy the University's General Education policy on humanities and social sciences as well as meeting engineering objectives. Thus, the courses chosen must satisfy all of the following criteria:

1. Six credits of General Education humanities courses, which must include
   a) Three credits of sophomore literature (200 level) or foreign language literature (300 level or higher) selected from General Education Section E.1*.
   b) Three credits selected from courses in General Education Section E.2*.
2. Six credits of social science courses selected from General Education Section F*.
3. At least three additional credits selected from the List of Approved Humanities and Social Science Courses for Engineering Curricula. (This list includes General Education courses, plus additional choices.)
4. To provide depth, the courses chosen must contain either
   a) Nine credits in a single subject area or
   b) Six credits in each of two different subjects.

Individual engineering curricula may have more specific requirements (e.g., an economics course or a second literature course may be required), or may require more than 15 hours of humanities/social science courses. Students should consult their academic advisors for information.

*All courses must be selected from the List of Approved Humanities and Social Science Courses for Engineering Curricula. Specifically, some courses approved in the General Education policy may not be accepted by the College of Engineering and Science because of Accreditation Board for Engineering and Technology (ABET) restrictions.

Electives for Engineering Curricula

Advisors must approve any course taken for elective credit in the Engineering curricula. Courses excluded for elective credit include PHYS 200, 207, 208.

Registration Requirements

A cumulative grade-point average of 2.0 or higher is required for registration in engineering courses numbered 300 or higher. Priority for registration in engineering courses is given to those majors for whom the course is a degree requirement. Exceptions to this requirement may be granted by the department offering the course.

Graduation Requirements

In addition to other institutional requirements, candidates for a baccalaureate degree in Engineering are required to have a 2.0 or higher cumulative grade-point ratio in all engineering courses taken at Clemson. All courses with "Engineering" in the course designator (e.g., ENGR 120, M E 453, etc.) are used in this calculation.

The baccalaureate programs in Engineering are designed to be completed in four years (eight regular semesters). Taking a reduced load or participating in cooperative education will extend this time. On average, Clemson engineering students take about four and one-half years to complete the requirements for graduation.

BIOSYSTEMS ENGINEERING

Bachelor of Science

The principal objective of the biosystems engineering program is to educate and prepare students for a wide range of engineering endeavors involving biological entities. Three main areas are supported: engineering for management of natural resources and the environment; engineering for environmentally-sound and sustainable production systems for food, fiber, and bioresources; and engineering for production of value-added products from bioprocessing technologies.

Biosystems engineers work at the interface between engineering and life sciences and must be knowledgeable in both disciplines. In addition to the common objectives of all engineering programs listed on page 66, Biosystems Engineering students should achieve familiarity with all biosystems concentrations, experience an interdisciplinary education, and develop a career goal of professional recognition and licensure. Students develop specialization in one of three concentrations. Specific objectives per concentration aim to equip students to

- apply engineering and agricultural sciences to the production of food, feed, fiber, and related consumer products (Agricultural Engineering Concentration).
- apply engineering and biological sciences to problem solving for biological systems and production of value added bioproducts in a wide range of industries (Applied Biotechnology Concentration).
- apply engineering and agricultural and environmental sciences to assess and control the impact of human activities on the biosphere (Natural Resources and Environment Concentration).

Additional information is available from the departmental offices and on our Web site at www.clemson.edu/agbioeng.

AGRICULTURAL ENGINEERING CONCENTRATION

Sophomore Year

First Semester

2 - B E 221 Surveying for Soil and Water Res.
2 - E G 209 Intro. to Engr./Comp. Graphics
3 - E M 201 Engineering Mechanics: Statics
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
3 - Elective
17

Second Semester

2 - B E 214 Fabrication and Manufacturing Meth.
3 - E M 202 Engineering Mechanics: Dynamics
3 - ENGL 314 Technical Writing
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - Humanities/Social Science Requirement[1]
3 - Literature Requirement[1]
18

Junior Year

First Semester

2 - B E 357 Machine Unit Operations
2 - E C E 307 Basic Electrical Engineering
3 - E M 304 Mechanics of Materials
3 - M E 310 Thermodynamics and Heat Transfer
3 - SPCH 250 Public Speaking
3 - Plant/Animal Science Requirement[2]
16

Second Semester

3 - B E 322 Small Watershed Hydrology and Sedimentology
2 - B E 333 Environmental Modification
2 - B E 350 Microcomputer Controls in Biosys.
3 - B E 362 Energy Conversion for Biosystems
4 - C E 341 Introduction to Fluid Mechanics
4 - CSENV 202 Soils
18

Senior Year

First Semester

3 - B E 416 Biosystems Engr. Capstone Design
2 - B E 431 Structural Design for Biosystems
3 - B E 450 Instrumentation for Biosys. Engineers
3 - I E 384 Engineering Economic Analysis
3 - Humanities/Social Science Requirement[1]
4 - Elective
18

Second Semester

2 - B E 421 Engr. Systems for Soil Water Mgt.
2 - B E 442 Properties and Proc. of Biol. Prod.
2 - B E 471 Engineering Research and Mgt.
3 - ECON 211 Principles of Microeconomics *or*
3 - ECON 200 Economic Concepts[3]
3 - Technical Requirement[2]
4 - Elective
16

135 Total Semester Hours

[1]See Policy on Humanities and Social Sciences for Engineering Curricula.

[2]See advisor.

[3]ECON 211 is preferred.

APPLIED BIOTECHNOLOGY CONCENTRATION

Sophomore Year

First Semester

2 - E G 209 Intro. to Engr./Comp. Graphics
3 - E M 201 Engineering Mechanics: Statics
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
4 - Organic Chemistry Requirement[1]
16

Second Semester

2 - B E 214 Fabrication and Manufacturing Meth.
3 - E M 202 Engineering Mechanics: Dynamics
3 - ENGL 314 Technical Writing
4 - MTHSC 208 Intro. to Ord. Diff. Equations
4 - Biochemistry Requirement[2]
16

Junior Year

First Semester

3 - B E 430 Problem Solving Methods and Models in Biosystems Engineering
2 - E C E 307 Basic Electrical Engineering
3 - E M 304 Mechanics of Materials
3 - M E 310 Thermodynamics and Heat Transfer
4 - MICRO 305 General Microbiology
3 - Technical Requirement[3]
18

Second Semester

2 - B E 333 Environmental Modification
2 - B E 350 Microcomputer Controls in Biosys.
3 - B E 362 Energy Conversion for Biosystems
3 - B E (CH E) 428 Biochemical Engineering
4 - C E 341 Introduction to Fluid Mechanics
3 - SPCH 250 Public Speaking
17

Senior Year

First Semester

3 - B E 416 Biosystems Engr. Capstone Design
3 - B E 435 Appl. in Biotechnology Engineering
3 - B E 450 Instrumentation for Biosys. Engineers
3 - Literature Requirement[5]
6 - Elective
18

Second Semester

2 - B E 442 Properties and Proc. of Biol. Prod.
2 - B E 471 Engineering Research and Mgt.
3 - ECON 211 Principles of Microeconomics *or*
3 - ECON 200 Economic Concepts[6]
6 - Humanities/Social Science Requirement[5]
5 - Elective
18

135 Total Semester Hours

[1]CH 201, 223/227, or 223/224 (with the extra two credit hours credited to electives). Students interested in medical careers should consider CH 223/224.

[2]BIOCH 210/211 or 301/302.

[3]Select math, statistics, computational science, or minor course.

[4]Select from courses in math, statistics, or computational science or minor course.

[5]See Policy on Humanities and Social Sciences for Engineering Curricula.

[6]ECON 211 is preferred.

NATURAL RESOURCES AND ENVIRONMENT CONCENTRATION

Sophomore Year

First Semester

2 - B E 221 Surveying for Soil and Water Res.
2 - E G 209 Intro. to Engr./Comp. Graphics
3 - E M 201 Engineering Mechanics: Statics
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
2 - Elective
16

Second Semester

2 - B E 214 Fabrication and Manufacturing Meth.
3 - E M 202 Engineering Mechanics: Dynamics
3 - ENGL 314 Technical Writing
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - Humanities/Social Science Requirement[1]
3 - Literature Requirement[1]
18

Junior Year

First Semester

2 - B E 357 Machine Unit Operations
2 - E C E 307 Basic Electrical Engineering
3 - E M 304 Mechanics of Materials
3 - M E 310 Thermodynamics and Heat Transfer
3 - SPCH 250 Public Speaking
3 - Biological Science Requirement[2]
16

Second Semester

3 - B E 322 Small Watershed Hydrology and Sedimentology
2 - B E 333 Environmental Modification
2 - B E 350 Microcomputer Controls in Biosys.
3 - B E 362 Energy Conversion for Biosystems
4 - C E 341 Introduction to Fluid Mechanics
4 - CSENV 202 Soils
18

Senior Year

First Semester

3 - B E 416 Biosystems Engr. Capstone Design
3 - B E 430 Problem Solving Methods and Models in Biosystems Engineering
2 - B E 431 Structural Design for Biosystems
3 - B E 450 Instrumentation for Biosys. Engineers
3 - Approved Engineering Requirement[2]
3 - Elective
17

Second Semester

3 - B E 364 Nonpoint Source Poll. Mgt. and Cont.
2 - B E 421 Engr. Systems for Soil Water Mgt.
2 - B E 471 Engineering Research and Mgt.
3 - ECON 211 Principles of Microeconomics *or*
3 - ECON 200 Economics Concepts[3]
3 - Humanities/Social Science Requirement[1]
5 - Elective
18

135 Total Semester Hours

[1]See Policy on Humanities and Social Sciences for Engineering Curricula.

[2]See advisor.

[3]ECON 211 is preferred.

CERAMIC AND MATERIALS ENGINEERING

Bachelor of Science

Ceramic and materials engineers design, develop, and participate in the manufacture of both standard and new materials intended for use in a wide variety of industries with diverse applications. These range from the semi-conductor to the aerospace and finally to the traditional ceramics industry. The broad scope of industrial responsibilities handled by ceramic and materials engineers requires knowledge in mathematics, science, engineering, and the social sciences, skills in problem solving, engineering analysis, design, and written and oral communication.

The baccalaureate program integrates laboratory with classroom experiences to prepare students for life-long learning. Courses covering thermodynamics, kinetics, mechanical behavior, processing and characterization of materials prepare students for careers in industry and/or for graduate school.

In addition to the common educational objectives of all engineering programs listed on page 66, baccalaureate degree graduates in Ceramic and Materials Engineering will be able to

- demonstrate learning consistent with Accreditation Board for Engineering and Technology Engineering Criteria 2000 for ceramic and materials engineering programs;
- function easily and well in the laboratory and plant environments; and
- serve the local, national, and international ceramic and materials communities.

Specifically, the Accreditation Board for Engineering and Technology Engineering Criteria 2000 requires that baccalaureate degree graduates in Ceramic and Materials Engineering be able to

- apply advanced scientific and engineering principles to ceramic and materials engineering systems;
- demonstrate an integrated understanding of the scientific and engineering principles underlying structure, properties, processing, and performance relationships;
- apply this understanding to the solution of ceramic and materials engineering selection and design problems; and
- apply appropriate experimental, statistical, and computational methods to advantage in the solution of ceramic and materials problems.

Sophomore Year

First Semester

3 - C M E 221 Materials Processing I
3 - C M E 225 Structure of Materials
3 - C M E 226 Thermodynamics of Materials
1 - C M E 241 Metrics Lab.
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
17

Second Semester

3 - C M E 222 Materials Processing II
3 - C M E 227 Transport Phenomena
3 - C M E 228 Phase Diagrams for Materials Processing and Applications
2 - C M E 242 Fabrication and Microscopy Lab.
2 - E G 209 Intro. to Engr./Comp. Graphics
4 - MTHSC 208 Intro. to Ord. Diff. Equations
17

Junior Year

First Semester

3 - C M E 320 Mechanical Behavior of Materials
3 - C M E 321 Characterization of Materials
3 - C M E 322 Thermal Processing of Materials
2 - C M E 341 Analytical Methods and Phase Dev.
3 - T C 415 Intro. to Polymer Science and Engr.
3 - Literature Requirement[1]
17

Second Semester

3 - C M E 303 Noncrystalline Materials
3 - C M E 323 Combustion Systems and Environmental Emissions
3 - C M E 330 Powder Processing
2 - C M E 342 Structure/Property Lab.
3 - C M E 361 Processing of Metals and Their Composites
3 - Humanities/Social Science Requirement[1]
17

Senior Year

First Semester

3 - C M E 402 Solid State Materials
3 - C M E 418 Process Control
1 - C M E 441 Manufacturing Lab.
3 - I E 384 Engineering Economic Analysis
3 - Technical Requirement[2]
4 - Elective
17

Second Semester

3 - C M E 407 Senior Capstone Design
6 - Humanities/Social Science Requirement[1]
3 - Technical Requirement[2]
6 - Elective
18

135 Total Semester Hours

[1]See Policy on Humanities and Social Sciences for Engineering Curricula.

[2]See advisor.

CHEMICAL ENGINEERING

Bachelor of Science

Chemical engineering is based on chemistry, physics, and mathematics. The curriculum at Clemson includes a blend of classroom and laboratory instruction and emphasizes broadly applicable fundamental principles and current technology to prepare graduates for immediate, productive employment as well as life-long learning and professional growth. Communication skills and group projects are emphasized because chemical engineers frequently work in multidisciplinary teams. Graduates are prepared to function effectively in chemical and related industries and post-graduate school; to identify, formulate, and solve chemical engineering problems; to develop skills for the successful practice of their profession; and to serve their chosen profession. Chemical engineers are involved in the research, manufacture, sales, and use of commodity and specialty chemicals,

petroleum products, synthetic fibers and textiles, pharmaceuticals, pulp and paper, electronic components, food and consumer goods, and many other products. They work at the forefront of environmental pollution prevention and remediation and apply engineering science and technology to solve a variety of medical and health-related problems.

In addition to the Bachelor of Science, the Department of Chemical Engineering offers advanced study leading to the Master of Science and Doctor of Philosophy degrees. Additional information can be found on our Web site at www.ces.clemson.edu/chemeng.

Sophomore Year

First Semester
3 - CH 223 Organic Chemistry
4 - CH E 211 Intro. to Chemical Engineering
2 - E G 209 Intro. to Engr./Comp. Graphics
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
3 - Literature Requirement[1]
19

Second Semester
3 - CH 224 Organic Chemistry
1 - CH 229 Organic Chemistry Lab.
3 - CH E 220 Chemical Engr. Thermodynamics I
3 - E M 201 Engineering Mechanics: Statics
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - Literature Requirement[1]
17

Junior Year

First Semester
1 - CH 339 Physical Chemistry Lab.
3 - CH E 311 Fluid Flow
3 - CH E 319 Engineering Materials
3 - CH E 321 Chemical Engr. Thermodynamics II
3 - MTHSC 302 Statistics for Science and Engr. *or*
    3 - EX ST 411 Statistical Methods for Process Development and Control
3 - Humanities/Social Science Requirement[1]
3 - Technical Requirement[2]
19

Second Semester
3 - CH 332 Physical Chemistry
1 - CH 340 Physical Chemistry Lab.
3 - CH E 307 Unit Operation Lab. I
3 - CH E 312 Heat and Mass Transfer
3 - CH E 353 Process Dynamics and Control
3 - Humanities/Social Science Requirement[1]
16

Senior Year

First Semester
3 - CH E 407 Unit Operations Lab. II
3 - CH E 413 Separation Processes
3 - CH E 431 Process Development, Design, and Optimization of Chemical Engr. Systems I
1 - CH E 443 Chemical Engr. Senior Seminar I
3 - CH E 450 Chemical Reaction Engineering
3 - Elective
16

Second Semester
5 - CH E 432 Process Development, Design, and Optimization of Chemical Engr. Systems II
1 - CH E 444 Chemical Engr. Senior Seminar II
3 - Advanced Chemistry Requirement[2]
3 - Technical Requirement[2]
7 - Elective
19

138 Total Semester Hours

[1]See Policy on Humanities and Social Sciences for Engineering Curricula. (Fifteen hours are required and must include six hours selected from ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210, or from 300-level foreign language literature courses.)

[2]See advisor.

Note: No student may exceed a maximum of two attempts, including a *W*, to complete successfully any CH E course.

CIVIL ENGINEERING

Bachelor of Science

Civil Engineering involves the planning, design, construction management, operation, and maintenance of facilities and systems in the built environment including bridges, buildings, airports, water supply systems, ports, dams, and highways.

The Civil Engineering program leads to the Bachelor of Science degree in Civil Engineering and includes the common educational objectives listed on page 66 for the College of Engineering and Science. The first two years provide students with building blocks necessary to be successful civil engineers. This includes proficiency in calculus, statistics, probability, physics, and chemistry. During the junior year, students receive a broad introduction to the fundamental areas of civil engineering (structures, hydraulics, geotechnical, transportation, environmental, construction materials, and project management). Design experiences are integrated throughout the curriculum, culminating in the senior year with a major capstone design project. In addition, during the senior year, students can select from available emphasis areas which serve to strengthen their undergraduate background.

The Civil Engineering program prepares students to work immediately upon graduation in most areas of civil engineering or to pursue graduate degrees. Students are also exposed to issues related to professional practice, including professional registration, life-long learning, and communication and team skills. Because a concerned society demands a realistic consideration of the impacts of engineering projects, civil engineering students are also educated in the broad areas of the humanities and social sciences.

The complete objectives of the program can be found on our Web site at www.ces.clemson. edu.

Sophomore Year

First Semester
3 - C E 251 Analysis Techniques in Civil Engr.
3 - C E 255 Geomatics
2 - E G 209 Intro. to Engr./Comp. Graphics
3 - E M 201 Engineering Mechanics: Statics
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
18

Second Semester
4 - C E 200 Structural Mechanics
2 - C E 253 Civil Engineering Measurements
3 - E M 202 Engineering Mechanics: Dynamics
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - SPCH 250 Public Speaking
1 - Elective
17

Junior Year

First Semester
3 - C E 301 Structural Analysis
4 - C E 341 Introduction to Fluid Mechanics
3 - C E 351 Civil Engineering Materials
2 - C E 352 Economic Evaluation of Projects
3 - ENGL 314 Technical Writing
3 - EX ST 301 Introductory Statistics
18

Second Semester
3 - C E 311 Transportation Engr. Plan. and Design
4 - C E 321 Geotechnical Engineering
3 - C E 331 Construction Engineering and Mgt.
3 - C E 342 Applied Hydraulics and Hydrology
1 - C E 353 Professional Seminar
3 - EE&S 401 Environmental Engineering
17

Senior Year

First Semester
6 - Humanities/Social Science Requirement[1]
3 - Technical Design Requirement[2]
3 - Technical Requirement[3]
6 - Elective
18

Second Semester
3 - C E 459 Capstone Design Project
3 - Humanities/Social Science Requirement[1]
3 - Literature Requirement[4]
3 - Technical Requirement[3]
3 - Elective
15

135 Total Semester Hours

[1]See policy on Humanities and Social Sciences for Engineering Curricula.

[2]See department policy on Technical Design Requirement.

[3]See policy on Technical Requirements. Technical Requirements and electives may be used to complete an emphasis area in one of the following fields: Applied Fluid Mechanics, Construction, Environmental Engineering, Geotechnical/Geoenvironmental Engineering, Structural Engineering.

[4]Select from sophomore literature courses (200 level only) or foreign language literature (300 level or higher).

Note: Civil Engineering students may neither enroll in nor receive credit for any C E or E M courses unless they have a 2.0 engineering grade-point ratio and a grade of C or higher in course prerequisites that have a C E or E M designation. Exceptions: 1) Students may always re-enroll in C E courses which they have previously completed with a grade of C or lower. 2) Students need not have a C or higher in 300-level C E courses to enroll in C E 459 (see course prerequisites).

COMPUTER ENGINEERING

Bachelor of Science

Computer engineers have excellent career opportunities in the design and application of hardware and software components for a variety of computer applications. These include mainframe, desktop, and embedded microprocessor platforms as well as the networking of various types of computers and peripherals.

Based on a strong foundation in mathematics, computer science, and the physical sciences, the Computer Engineering program includes engineering science and design in circuits, electronics, computer organizations and design, peripheral interfacing, and software engineering. Emphasis is placed on hands-on experience with networked computer systems, micro-, mini-, and mainframe computers, and the solution of a wide range of practical problems, using engineering principles. In addition to these technical skills, students learn to communicate effectively and to develop interpersonal, teamwork, and management skills, all of which contribute to success in a professional engineering career. The program is also an excellent preparation for graduate study.

The program also includes significant elective hours that allow students to specialize in one or more technical areas or to further broaden the educational base to enable career growth in a desired direction. Detailed information on the program and its objectives can be found on the Web at www.ece.clemson.edu.

Sophomore Year

First Semester
4 - CP SC 210 Programming Methodology *or*
    4 - CP SC 102 Computer Science II
3 - E C E 201 Logic and Computing Devices
3 - E C E 202 Electric Circuits I
1 - E C E 211 Electrical Engineering Lab. I
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
18

Second Semester
4 - CP SC 212 Algorithms and Data Structures
1 - E C E 212 Electrical Engineering Lab. II
3 - E C E 262 Electric Circuits II
4 - E C E 272 Computer Organization
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - MTHSC 311 Linear Algebra
19

Junior Year

First Semester
1 - E C E 311 Electrical Engineering Lab. III
3 - E C E 320 Electronics I
3 - E C E 329 Computer Systems Structures
3 - E C E 330 Signals, Systems, and Transforms
4 - E C E 371 Microcomputer Interfacing
3 - MTHSC 419 Discrete Math. Structures I
1 - Elective
18

Second Semester
3 - E C E 317 Random Signal Analysis
3 - E C E 352 Programming Systems
3 - Engineering Science Requirement[1]
3 - Humanities/Social Science Requirement[2]
3 - Oral Communication Requirement[1]
3 - Elective
18

Senior Year

First Semester
3 - E C E 417 Elements of Software Engineering
3 - E C E 426 Digital Computer Design
3 - Application Sequence Requirement[1,3]
3 - Design Requirement[1,3]
3 - Humanities/Social Science Requirement[2]
3 - Elective
18

Second Semester
3 - E C E 453 Software Practicum
3 - Computer Engineering Requirement[1,3]
3 - Design Requirement[1,3]
3 - Humanities/Social Science Requirement[2]
3 - Literature Requirement[2]
3 - Elective
18

141 Total Semester Hours

[1]Select from list of courses approved by the department.

[2]See Policy on Humanities and Social Sciences for Engineering Curricula.

[3]One course that satisfies the Design Requirement, Application Sequence Requirement, or Computer Engineering Requirement must also satisfy the Probability and Statistics Requirement (selected from a department-approved list).

Notes:

1. A student is allowed to enroll in E C E courses (excluding E C E 307, 308, 309) only when all prerequisites, as defined by current official listings for that course, have been passed with a grade of C or higher.
2. All Computer Engineering students must have a cumulative engineering grade-point ratio of 2.0 to enroll in any 300- or 400-level E C E courses.
3. No student may exceed a maximum of two attempts, including a *W*, to complete successfully any E C E course.

ELECTRICAL ENGINEERING

Bachelor of Science

Electrical engineers are in high demand for a wide range of influential positions. Professional duties range from analytical problem solving to the design of components and systems. The scope of employment requires a unique breadth and depth of knowledge and technical skills, which are reflected in the Electrical Engineering program. This program also offers an excellent preparation for graduate education. Detailed information can be found on our Web site at www.ece.clemson.edu.

Building on a foundation of mathematical and physical sciences, students progress into the application of these in the engineering science areas of circuits, electronics, communications, controls, power, and electromagnetics. In these subjects, students also begin to apply the concepts and techniques learned to the design of circuits and systems. Senior technical design courses offer the opportunity to further develop expertise in a selected area.

In addition to these technical skills, students learn to communicate effectively, both orally and with the written word. Because engineers work for the benefit of society, the curriculum includes a strong component of humanities and social science courses. Also, many project design assignments enable the development of interpersonal, teamwork, and management skills which are necessary for success in a professional engineering career.

Sophomore Year

First Semester
3 - CP SC 111 Elem. Computer Prog. in C/C++
3 - E C E 201 Logic and Computing Devices
3 - E C E 202 Electric Circuits I
1 - E C E 211 Electrical Engineering Lab. I
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
17

Second Semester
1 - E C E 212 Electrical Engineering Lab. II
3 - E C E 262 Electric Circuits II
4 - E C E 272 Computer Organization
3 - E M 201 Engineering Mechanics: Statics
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - Elective
18

Junior Year

First Semester
1 - E C E 311 Electrical Engineering Lab. III
3 - E C E 320 Electronics I
3 - E C E 330 Signals, Systems, and Transforms
4 - E C E 371 Microcomputer Interfacing
3 - E C E 380 Electromagnetics
3 - Technical Requirement (Advanced Mathematics)[1]
17

Second Semester
1 - E C E 312 Electrical Engineering Lab. IV
3 - E C E 317 Random Signal Analysis
3 - E C E 321 Electronics II
3 - E C E 360 Electric Power Engineering
3 - E C E 381 Fields, Waves, and Circuits
3 - Humanities/Social Science Requirement[2]
16

Senior Year

First Semester
3 - E C E 409 Continuous and Discrete Syst. Des.
3 - E C E 427 Communications Systems
2 - E C E 495 Integrated System Design I
3 - M E 310 Thermodynamics and Heat Transfer
3 - Literature Requirement[2]
3 - Technical Requirement (Electrical and Computer Engineering)[1]
17

Second Semester
2 - E C E 496 Integrated System Design II
6 - Humanities/Social Science Requirement[2]
3 - Technical Requirement (Electrical and Computer Engineering)[1]
7 - Elective
18

135 Total Semester Hours

[1]Select from list maintained in the department.

[2]See Policy on Humanities and Social Sciences for Engineering Curricula.

Notes:

1. A student is allowed to enroll in E C E courses (excluding E C E 307, 308, 309) only when all prerequisites have been passed with a grade of C or higher.
2. All Electrical Engineering students must have a cumulative engineering grade-point ratio of 2.0 to enroll in any 300- or 400-level E C E courses. In addition, no student may exceed a maximum of two attempts, including a W, to complete successfully any E C E course.

INDUSTRIAL ENGINEERING

Bachelor of Science

Industrial engineers design, install, and improve the complex systems which provide goods and services vital to our society and economy. These systems integrate people, materials, and equipment, and thereby place unique demands for breadth of preparation on industrial engineers. Knowledge is required in mathematical, physical, and social sciences; economic, operational, and engineering analyses; and the principles and techniques of engineering design. Because industrial engineering problems relate closely to management, industrial engineers need to be able to work and communicate well with managers.

The traditional arenas for the practice of industrial engineering are the manufacturing facilities of industry; however, fully one-third of practicing industrial engineers are employed in non-manufacturing institutions such as hospitals and banks and in government service. The department emphasizes quality, ergonomics, and design in these non-traditional areas, as well as the changing manufacturing world, to prepare students both for professional practice and further study.

In addition to numerous employment opportunities, industrial engineering graduates may further their formal education. The Department of Industrial Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees.

Current curriculum and department information can be found on our Web site at www-ie.ces.clemson.edu.

Sophomore Year

First Semester

3 - C M E 210 Introduction to Materials Science
2 - E G 209 Intro. to Engr./Comp. Graphics
4 - I E 201 System Design I
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
16

Second Semester

3 - E M 201 Engineering Mechanics: Statics
4 - I E 210 Design and Analysis of Work Systems
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - MTHSC 302 Statistics for Science and Engr.
3 - SPCH 250 Public Speaking
17

Junior Year

First Semester

3 - E M 304 Mechanics of Materials[1]
3 - ENGL 314 Technical Writing
3 - I E 320 Design of Info. Systems in Ind. Engr.
3 - I E 380 Methods of Operational Research I
3 - I E 384 Engineering Economic Analysis
3 - M E 310 Thermodynamics and Heat Transfer
18

Second Semester

2 - E C E 307 Basic Electrical Engineering
1 - E C E 309 Electrical Engineering Lab. I
3 - I E 340 Systems and Flows
3 - I E 361 Industrial Quality Control
1 - I E 368 Prof. Practice in Industrial Engineering
3 - I E 381 Methods of Operational Research II
3 - Humanities Requirement E.1[2]
16

Senior Year

First Semester

3 - I E 461 Quality Engineering
3 - I E 482 Systems Modeling
3 - I E 486 Production Planning and Control
3 - Humanities/Social Science Requirement[3]
5 - Elective
17

Second Semester

3 - I E 467 Systems Design II
6 - Humanities/Social Science Requirement[3]
3 - Technical Requirement[4]
5 - Elective
17

133 Total Semester Hours

[1]C E 200 or E M 202 may substitute.

[2]See General Education requirements.

[3]See advisor.

[4]Choose from an approved list maintained by the Industrial Engineering Department.

Notes:

1. In each I E course taken, a student must make a grade of C or higher.
2. A student is allowed to enroll in I E courses only when all prerequisites, as defined by the current official listings for those courses, have been passed with a grade of C or higher.

MECHANICAL ENGINEERING

Bachelor of Science

Breadth, individuality, and flexibility are inherent characteristics of the mechanical engineering profession. Mechanical engineers, in a broad sense, make major contributions to the creation of products and systems that benefit mankind. They work in a variety of areas including bioengineering, energy systems, environmental and life-support systems, propulsion and transportation systems, food production, materials processing, automated manufacturing, and construction. A wide spectrum of career opportunities is open to them.

The practice of mechanical engineering includes one or more of the following activities: manufacturing, testing, research, development, design, technical management, technical sales and marketing, construction, and teaching.

Preparation for a 40–45 year professional career requires development of the whole person through a balanced program encompassing the humanities, social sciences, communication and computer skills, physical and engineering sciences, design, and laboratory experience. Students start with the physical sciences and communication skills and progress through the engineering sciences, ultimately applying the principles learned in such areas as energy conversion and transfer, mechanical design, and systems analysis. Throughout the curriculum, the fundamental nature of engineering as a problem-solving discipline is emphasized.

Most graduates take positions in industry, government, or business. Many, however, continue their formal education in a graduate program. The Department of Mechanical Engineering offers study leading to the Master of Engineering, Master of Science, and Doctor of Philosophy degrees.

Additional information can be found on our Web site at www.ces.clemson.edu/me.

Sophomore Year

First Semester

2 - E G 209 Intro. to Engr./Comp. Graphics
3 - E M 201 Engineering Mechanics: Statics
3 - M E 202 Foundations of Mechanical Systems
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
3 - Humanities/Social Science Requirement[1]
18

Second Semester

2 - E C E 307 Basic Electrical Engineering
1 - E C E 309 Elecrical Engineering Lab. I
3 - E M 202 Engineering Mechanics: Dynamics
3 - M E 203 Found. of Thermal and Fluid Syst.
2 - M E 205 Computer Analysis in Engineering
1 - M E 221 Mechanical Engineering Lab. I
4 - MTHSC 208 Intro. to Ord. Diff. Equations
16

Junior Year

First Semester

3 - E M 304 Mechanics of Materials
3 - E M 320 Fluid Mechanics
3 - EX ST 411 Statistical Methods for Process Development and Control *or*
3 - MTHSC 302 Stats. for Science and Engr.
3 - M E 303 Thermodynamics
2 - M E 322 Mechanical Engineering Lab. II
3 - Humanities/Social Science Requirement[1]
17

Second Semester

3 - M E 301 Materials for Mech. Engr. Appl.
3 - M E 304 Heat Transfer
3 - M E 305 Model. and Analysis of Dynamic Syst.
3 - M E 306 Fundamentals of Machine Design
2 - M E 323 Mechanical Engineering Lab. III
3 - Elective
17

Senior Year

First Semester

3 - M E 401 Mechanical Engineering Design
3 - M E 404 Manufacturing Proc. and Their Appl.
1 - M E 424 Mechanical Engineering Lab. IV
3 - Literature Requirement[2]
3 - Technical Requirement[3]
4 - Elective
17

Second Semester

1 - M E 400 Senior Seminar
3 - M E 402 Internship in Engineering Design
3 - Humanities/Social Science Requirement[1]
6 - Technical Requirement[3]
3 - Elective
16

133 Total Semester Hours

[1]Select from list of approved Humanities/Social Science courses.

[2]Select from 200-level literature or 300-level and higher foreign language literature courses.

[3]See advisor for departmental list of approved course.

Note: A student is allowed to enroll in any M E or E M course only when all prerequisites, as defined by current official listings for that course, have been passed with a grade of C or higher.

SCIENCE PROGRAMS

The College offers curricula leading to the Bachelor of Science in Chemistry, Computer Information Systems, Computer Science, Geology, Mathematical Sciences, and Physics. The Bachelor of Arts is offered with a major in Chemistry, Computer Science, Geology, Mathematical Sciences, and Physics.

The science departments in the College work closely with the other academic departments in the University, including such disciplines as economics and management as well as engineering. This allows students in the sciences great flexibility and responsibility in designing their own programs.

Bachelor of Science Curricula

The Bachelor of Science degree prepares graduates for professional employment or graduate study in the chosen science discipline. BS curricula are thus more highly structured than BA curricula, but nonetheless offer ample opportunity for students to pursue a minor or secondary area of interest.

Bachelor of Arts Curricula

The curricula leading to the Bachelor of Arts degree are designed to meet the needs of students who desire a broad general education. They require a minor (or a second major) as well as the major concentration. A major requires a minimum of 24 credits from courses above the sophomore level including or in addition to courses specified by the major department. In some major disciplines, certain prescribed courses at the sophomore level are counted toward the 24 credit requirement.

Students have a large degree of flexibility and responsibility in selecting the minor area from those listed on page 82. The courses for these minors are to be selected in consultation with the appropriate department.

CHEMISTRY

Bachelor of Science

Chemistry, an experimental discipline based on observation guided by molecular theory, is of fundamental importance in much of modern science and technology. Its molecular concepts form the basis for ideas about complex material behavior. Due to the fundamental nature and extensive application of chemistry, an unusually large variety of challenging opportunities to contribute in the science-oriented community are open to students whose education is built around the principles of this discipline.

The curriculum, through the career requirement options and the large number of electives, provides students the opportunity to select a coherent program of study beyond the basic courses. Career requirement options are provided for students anticipating graduate study in chemistry or related fields; employment following the BS degree in laboratory, production, technical sales, or management positions; professional studies (e.g., medicine); chemical physics; geochemistry; and employment in fields requiring extensive preparation in courses other than sciences (e.g., patent law and technical writing). Significant features of the curriculum are the student's extensive participation in experimental work and the opportunity to take part in a research investigation during the junior and senior years.

Freshman Year

First Semester

4 - CH 101 General Chemistry
1 - CH 141 Chemistry Orientation
3 - CP SC 111 Elem. Computer Prog. in C/C++
3 - ENGL 101 Composition I
4 - MTHSC 106 Calculus of One Variable I
15

Second Semester

4 - CH 102 General Chemistry
2 - CH 205 Intro. to Inorganic Chemistry
1 - CH 206 Inorganic Chemistry Lab.
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
17

Sophomore Year

First Semester

3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
1 - PHYS 223 Physics Lab. II
4 - Foreign Language Requirement[1]
16

Second Semester

3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - PHYS 222 Physics with Calculus III
1 - PHYS 224 Physics Lab. III
4 - Foreign Language Requirement[1]
16

Junior Year

First Semester

3 - CH 313 Quantitative Analysis
2 - CH 315 Quantitative Analysis Lab.
3 - CH 331 Physical Chemistry
1 - CH 339 Physical Chemistry Lab.
3 - Humanities Requirement[2]
3 - Literature Requirement[3]
3 - Oral Communication Requirement[4]
18

Second Semester

3 - CH 332 Physical Chemistry
1 - CH 340 Physical Chemistry Lab.
3 - CH 411 Instrumental Analysis
2 - CH 412 Instrumental Analysis Lab.
3 - ENGL 314 Technical Writing
3 - Social Science Requirement[2]
15

Senior Year

First Semester

3 - CH 402 Inorganic Chemistry
3 - CH 443 Research Problems
3 - Chemistry Requirement[5]
3 - Social Science Requirement[2]
6 - Elective
18

Second Semester

3 - CH 444 Research Problems
3 - Chemistry Requirement[5]
9 - Elective
15

130 Total Semester Hours

[1]Two semesters of the same modern language.

[2]See General Education Requirements. See also other college requirements.

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]SPCH 150, 250, 251, or as approved by advisor.

[5]See advisor. CH 421 and 435 are recommended for students qualifying for graduate studies.

CHEMISTRY

Bachelor of Arts

Freshman Year

First Semester

4 - CH 101 General Chemistry
1 - CH 141 Chemistry Orientation
3 - CP SC 111 Elem. Computer Prog. in C/C++
3 - ENGL 101 Composition I
4 - MTHSC 106 Calculus of One Variable I
15

Second Semester

4 - CH 102 General Chemistry
2 - CH 205 Introduction to Inorganic Chemistry
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
16

Sophomore Year

First Semester
3 - CH 223 Organic Chemistry[1]
1 - CH 227 Organic Chemistry Lab.[1]
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
4 - Foreign Language Requirement[2]
15

Second Semester
3 - CH 224 Organic Chemistry[1]
1 - CH 228 Organic Chemistry Lab.[1]
3 - HIST 172 Western Civilization
4 - Foreign Language Requirement[2]
3 - Literature Requirement[3]
3 - Elective
17

Junior Year

First Semester
3 - CH 313 Quantitative Analysis
1 - CH 317 Quantitative Analysis Lab.
3 - HIST 173 Western Civilization
3 - Foreign Language Requirement[2]
3 - Humanities Requirement E.2[4]
3 - Minor[5]
16

Second Semester
3 - CH 331 Physical Chemistry
3 - ENGL 314 Technical Writing
3 - Foreign Language Requirement[2]
6 - Minor[5]
3 - Oral Communication Requirement[6]
18

Senior Year

First Semester
3 - CH 332 Physical Chemistry
3 - Chemistry Requirement[7]
3 - Minor[5]
9 - Elective
18

Second Semester
3 - Chemistry Requirement[7]
3 - Minor[5]
9 - Elective
15

130 Total Semester Hours

[1]CH 223/227 and 224/228 will count toward the 24 hours of the Chemistry major.

[2]Four semesters of the same modern language.

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]See General Education Requirements.

[5]See minors on page 82.

[6]SPCH 150, 250, 251, or as approved by advisor.

[7]See advisor.

COMPUTER INFORMATION SYSTEMS

Bachelor of Science

The Computer Information Systems degree program is oriented toward computer applications in management-related problems. The program emphasizes functional areas of management including accounting, production, marketing and finance, and the applications of computers in these areas. The curriculum is designed to prepare students for careers in areas such as systems design and analysis, applications programming, database administration, and information retrieval as well as for continued study toward an advanced degree.

Students who change majors into Computer Information Systems must have a cumulative grade-point ratio of 2.0 or better.

Additional information can be found on our Web site at www.cs.clemson.edu.

Freshman Year

First Semester
4 - CP SC 101 Computer Science I
3 - ENGL 101 Composition I
4 - MTHSC 106 Calculus of One Variable I
3 - Humanities Requirement E.2[1]
3 - Social Science Requirement[1]
17

Second Semester
4 - CP SC 102 Computer Science II
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
3 - Natural Science Requirement[2]
3 - Social Science Requirement[1]
17

Sophomore Year

First Semester
4 - CP SC 212 Algorithms and Data Structures
3 - ECON 211 Principles of Microeconomics
3 - MTHSC 119 Intro. to Discrete Methods
3 - Literature Requirement[3]
4 - Natural Science Requirement[2]
17

Second Semester
3 - ACCT 201 Financial Accounting Concepts
3 - CP SC 215 Tools and Tech. for Software Dev.
4 - CP SC 231 Intro. to Computer Organization
1 - CP SC 291 Seminar in Professional Issues I
3 - MTHSC 210 Applied Matrix Algebra *or*
    3 - MTHSC 311 Linear Algebra
4 - Natural Science Requirement[2]
18

Junior Year

First Semester
3 - ACCT 202 Managerial Accounting Concepts
3 - CP SC 332 Computer Systems[4]
3 - MKT 301 Principles of Marketing
3 - MTHSC 301 Stat. Theory and Methods I *or*
    3 - MTHSC 302 Stats. for Science and Engr.
3 - Oral Communication Requirement[5]
15

Second Semester
3 - CP SC 360 Distributed and Network Prog.
3 - CP SC 372 Intro. to Software Development
3 - ENGL 314 Technical Writing
3 - MGT 301 Principles of Management
3 - Elective
15

Senior Year

First Semester
3 - CP SC 462 Database Management Systems
1 - CP SC 491 Seminar in Professional Issues II[6]
3 - Business Requirement[7]
3 - Computer Science Requirement[8]
4 - Elective
14

Second Semester
3 - MA SC 312 Decision Models for Management
3 - Business Requirement[7]
3 - Computer Science Requirement[8]
3 - Humanities/Social Science Requirement[1]
3 - Elective
15

128 Total Semester Hours

[1]See General Education Requirements.

[2]Select from BIOL 101/102, 103/104, 110/111; CH 101/102, 105/106; PHYS 122/124, 207/208, 221/223. The other three hours may be selected from EN SP 200 or any course designated BIOL, CH, GEOL, BIOCH, BIOSC, MICRO, or PHYS.

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]For a stronger emphasis on operating systems, CP SC 422 may be substituted.

[5]Select from SPCH 150, 250, 251.

[6]CP SC H395 may be substituted.

[7]Select from FIN 306, MGT 390, 400.

[8] CP SC 330, 350, or any 400-level CP SC course except 422.

Notes:

1. For graduation, a candidate for the BS degree in Computer Information Systems must have earned a grade of C or better in each CP SC course applied to the degree.
2. Before enrolling in a CP SC course, a grade of C or better must be earned in all prerequisite courses (including CP SC, E C E, and MTHSC courses).
3. No student may exceed a maximum ot two attempts, excluding a *W*, to complete successfully a CP SC course.

COMPUTER SCIENCE

Bachelor of Science

The Computer Science degree program is oriented toward design, implementation, and application of software systems to solve information processing problems. An emphasis area outside computer science allows the program to be tailored to the needs and interests of individual students. This program is more technically oriented than the Computer Information Systems curriculum. It prepares students for employment in the computer software field or for continued study toward an advanced degree in computer science. This program is accredited by the Computer Science Accreditation Commission of the Computing Sciences Accreditation Board.

Students who change majors into Computer Science must have a cumulative grade-point ratio of 2.0 or better.

Additional information can be found on our Web site at www.cs.clemson.edu.

Freshman Year

First Semester
4 - CP SC 101 Computer Science I
3 - ENGL 101 Composition I
4 - MTHSC 106 Calculus of One Variable I
3 - Humanities Requirement E.2[1]
3 - Social Science Requirement[1]
17

Second Semester
4 - CP SC 102 Computer Science II
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
3 - Humanities/Social Science Requirement[1]
3 - Social Science Requirement[1]
17

Sophomore Year

First Semester
4 - CP SC 212 Algorithms and Data Structures
3 - MTHSC 119 Intro. to Discrete Methods
3 - PHYS 122 Physics with Calculus I
3 - Literature Requirement[2]
3 - Elective
16

Second Semester
3 - CP SC 215 Tools and Tech. for Software Dev.
4 - CP SC 231 Intro. to Computer Organization
1 - CP SC 291 Seminar in Professional Issues I
3 - E C E 201 Logic and Computing Devices
3 - PHYS 221 Physics with Calculus II
3 - Oral Communication Requirement[3]
17

Junior Year

First Semester
4 - CP SC 330 Computer Systems and Networks
3 - CP SC 360 Distributed and Network Prog.
3 - MTHSC 311 Linear Algebra
3 - Emphasias Area[4]
3 - Natural Science Requirement[5]
16

Second Semester
3 - CP SC 372 Intro. to Software Development
3 - CP SC 422 Intro. to Operating Systems
3 - ENGL 314 Technical Writing
3 - Emphasis Area[4]
4 - Natural Science Requirement[5]
16

Senior Year

First Semester
3 - CP SC 350 Foundations of Computer Science
3 - CP SC 428 Design and Implementation of Programming Languages
3 - MTHSC 302 Stats. for Science and Engr. *or*
3 - MTHSC 301 Stat. Theory and Methods I
3 - Computer Science Requirement[6]
3 - Emphasis Area[4]
15

Second Semester
1 - CP SC 491 Seminar in Professional Issues II[7]
3 - Computer Science Requirement[6]
3 - Nontechnical Requirement[8]
7 - Elective
14

128 Total Semester Hours

[1]See General Education Requirements.

[2]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[3]Select from SPCH 150, 250, 251.

[4]Nine hours from the same University-approved minor.

[5]Select from BIOL 101/102, 103/104, 110/111, CH 101/102, 105/106, GEOL 101/103/102, 112/114. Alternately, if PHYS 124 and 223 are completed, six hours may be selected from EN SP 200 or courses designated as BIOL, BIOCH, BIOSC, CH, GEOL, MICRO, or PHYS.

[6]Select from 400-level CP SC courses. One course must be chosen from CP SC 411, 429, 462, 472.

[7]CP SC H395 may be substituted.

[8]Any course taught outside the College of Engineering and Science and the biological sciences.

Notes:

1. For graduation, a candidate for the BS degree in Computer Science must have earned a grade of C or better in each CP SC course applied to the degree.
2. A grade of C or better must be earned in all prerequisite courses (including CP SC, E C E, and MTHSC courses) before enrolling in the next CP SC course.
3. No student may exceed a maximum of two attempts, excluding a *W*, to complete successfully any CP SC course.

COMPUTER SCIENCE

Bachelor of Arts

The Bachelor of Arts in Computer Science is ideal for students interested in acquiring a broad-based liberal arts education that includes a strong and solid understanding of computer science. The curriculum is oriented toward design, implementation, and application of computer software systems to solve information processing problems. The program prepares students for employment in the computer software field or for continued study toward an advanced degree in computer science.

Students who change majors into Computer Science must have a cumulative grade-point ratio of 2.0 or better.

Additional information can be found on our Web site at www.cs.clemson.edu.

Freshman Year

First Semester
4 - CP SC 101 Computer Science I
3 - ENGL 101 Composition I
4 - MTHSC 106 Calculus of One Variable I
4 - Foreign Language Requirement[1]
15

Second Semester
4 - CP SC 102 Computer Science II
3 - ENGL 102 Composition II
3 - HIST 172 Western Civilization
4 - MTHSC 108 Calculus of One Variable II
4 - Foreign Language Requirement[1]
18

Sophomore Year

First Semester
4 - CP SC 212 Algorithms and Data Structures
3 - MTHSC 119 Intro. to Discrete Methods
3 - Foreign Language Requirement[1]
3 - Literature Requirement[2]
4 - Natural Science Requirement[3]
17

Second Semester
3 - CP SC 215 Tools and Tech. for Software Dev.
4 - CP SC 231 Intro. to Computer Organization
3 - Foreign Language Requirement[1]
3 - Literature Requirement[2]
4 - Natural Science Requirement[3]
17

Junior Year

First Semester
3 - CP SC 332 Computer Systems[4]
3 - CP SC 360 Distributed and Network Prog.
3 - ENGL 314 Technical Writing
3 - MTHSC 301 Stat. Theory and Methods I *or*
3 - MTHSC 302 Stats. for Science and Engr. *or*
3 - MTHSC 311 Linear Algebra
3 - Minor
15

Second Semester
1 - CP SC 291 Seminar in Professional Issues I
3 - CP SC 372 Intro. to Software Development
3 - HIST 173 Western Civilization
3 - Oral Communication Requirement[5]
6 - Minor
16

Senior Year

First Semester
6 - Computer Science Requirement[6]
3 - Departmental Requirement[7]
3 - Fine Arts Requirement[8]
3 - Minor
15

Second Semester
3 - Computer Science Requirement[4]
3 - Minor
10 - Elective
16

129 Total Semester Hours

[1]Four semesters of the same language.

[2]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[3]Select from BIOL 101/102, 103/104, 110/111; CH 101/102, 105/106; PHYS 122/124, 207/208, 221/223.

[4]For a stronger emphasis on operating systems, CP SC 422 may be substituted.

[5]Select from SPCH 150, 250, 251.

[6]CP SC 330, 350, or any 400-level CP SC course except 422.

[7]Select from HIST 198 (three times) or courses in ANTH, PHIL, PO SC, 200-level literature, or 300-level foreign language literature.

[8]Select from MUSIC 210, 311, THEA 210, or courses in ART or A A H.

Notes:

1. For graduation, a candidate for the BA degree in Computer Science must have earned a grade of C or better in each CP SC course applied to the degree.
2. A grade of C or better must be earned in all prerequisite courses (including CP SC, E C E, and MTHSC courses) before enrolling in the next CP SC course.
3. No student may exceed a maximum of two attempts, excluding a *W*, to complete successfully any CP SC course.

GEOLOGY

Bachelor of Science

Geology involves the physics and chemistry of materials which comprise the earth, but equally important, it considers the development of life on earth. Fundamentally, the chemical, physical, and biological responses to environments on and in the earth must be thoroughly understood so that the historical development of the earth can be deduced, predictions of the future inferred, and natural resources intelligently developed. Industry depends on minerals and rocks; metals have their origin in them as do our chief power sources: coal, petroleum, and radioactive minerals.

Employment opportunities for geologists include such far-reaching fields as mineral-producing industries, railroads, municipalities, engineering firms, and water authorities. It is important, therefore, that a geology education rest on a broad yet rigorous base.

Students pursuing a Bachelor of Science degree in Geology have three concentrations from which to choose. The "traditional" curriculum provides the fundamentals of geology and excellent support in the other basic sciences. Students completing this curriculum are prepared for employment or for graduate study in any field of geology. The Environmental Geology concentration prepares students for careers in the environmental consulting industry. Students in this concentration take 15 credits of Environmental Science Requirement, including at least nine credits from one of three subdisciplines: geology/soil science, biology/ecology, or chemistry/physics. The Engineering Geology concentration may be taken by students interested in applying engineering principles to geologic problems. Engineering geologists are increasingly called upon to perform geologic site evaluations for construction projects and to minimize the threat of geologic hazards. The curriculum involves courses in engineering and soil mechanics plus 15 credits of Engineering Geology Requirement selected from courses in civil, environmental, and biosystems engineering, or advanced mathematics.

Freshman Year

First Semester
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
1 - GEOL 100 Current Topics in Geology
3 - GEOL 101 Physical Geology
1 - GEOL 103 Physical Geology Lab.
4 - MTHSC 106 Calculus of One Variable I
16

Second Semester
4 - CH 102 General Chemistry
3 - ENGL 102 Composition II
4 - GEOL 102 Historical Geology
4 - MTHSC 108 Calculus of One Variable II
15

Sophomore Year

First Semester
4 - BIOL 103 General Biology I
4 - GEOL 302 Structural Geology
4 - MTHSC 206 Calculus of Several Variables
3 - Literature Requirement[1]
15

Second Semester
3 - CP SC 110 Elementary Computer Prog. *or*
3 - CP SC 111 Elem. Comp. Prog. in C/C++
4 - GEOL 306 Mineralogy
3 - PHYS 122 Physics with Calculus I
3 - SPCH 250 Public Speaking
3 - Humanities Requirement E.2[2]
16

Junior Year

First Semester
3 - ENGL 314 Technical Writing
3 - GEOL 314 Sedimentary Petrology
3 - PHYS 221 Physics with Calculus II
3 - Social Science Requirement[2]
3 - Elective
15

Second Semester
3 - EX ST 301 Introductory Statistics
6 - Geology Requirement[3]
3 - Social Science Requirement[2]
3 - Elective
15

Summer

6 - Summer Geology Field Course[4]

Senior Year

First Semester
3 - GEOL 316 Igneous and Metamorphic Petrol.
3 - GEOL 403 Invertebrate Paleontology
3 - Technical Requirement[5]
6 - Elective
15

Second Semester
3 - GEOL 401 Applied Geophysics
3 - GEOL 413 Stratigraphy
3 - Geology Requirement[3]
3 - Technical Requirement[5]
5 - Elective
17

130 Total Semester Hours

[1]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.
[2]See General Education Requirements.
[3]Select from 300 or 400-level geology courses.
[4]GEOL 475 or select from departmental list.
[5]Choose from departmental list of approved courses.

ENGINEERING GEOLOGY CONCENTRATION

Freshman Year

First Semester
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
1 - GEOL 100 Current Topics in Geology
3 - GEOL 101 Physical Geology
1 - GEOL 103 Physical Geology Lab.
4 - MTHSC 106 Calculus of One Variable I
16

Second Semester
4 - CH 102 General Chemistry
3 - ENGL 102 Composition II
4 - GEOL 102 Historical Geology
4 - MTHSC 108 Calculus of One Variable II
15

Sophomore Year

First Semester
3 - C E 255 Geomatics
3 - CP SC 110 Elementary Computer Prog. *or*
3 - CP SC 111 Elem. Comp. Prog. in C/C++
4 - GEOL 302 Structural Geology
4 - MTHSC 206 Calculus of Several Variables
3 - Literature Requirement[1]
17

Second Semester
4 - GEOL 306 Mineralogy
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - PHYS 122 Physics with Calculus I
3 - SPCH 250 Public Speaking
3 - Social Science Requirement[2]
17

Junior Year

First Semester
3 - E M 201 Engineering Mechanics: Statics
3 - ENGL 314 Technical Writing
3 - PHYS 221 Physics with Calculus II
3 - Engineering Geology Requirement[3]
3 - Geology Requirement[4]
15

Second Semester
3 - E M 304 Mechanics of Materials
3 - EX ST 301 Introductory Statistics
3 - GEOL 320 Engineering Geology
3 - Engineering Geology Requirement[3]
3 - Humanities Requirement E.2[2]
15

Summer

6 - Summer Geology Field Course[5]

Senior Year

First Semester
3 - GEOL 408 Geohydrology
3 - Engineering Geology Requirement[3]
3 - Social Science Requirement[2]
6 - Elective
15

Second Semester
3 - GEOL 401 Applied Geophysics
6 - Engineering Geology Requirement[3]
5 - Elective
14

130 Total Semester Hours

[1]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.
[2]See General Education Requirements.
[3]Select from departmental list of approved courses. A minimum of 15 credits is required.
[4]Select from 300- or 400-level geology courses.
[5]GEOL 475 or select from departmental list.

ENVIRONMENTAL GEOLOGY CONCENTRATION

Freshman Year

First Semester
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
1 - GEOL 100 Current Topics in Geology
3 - GEOL 101 Physical Geology
1 - GEOL 103 Physical Geology Lab.
4 - MTHSC 106 Calculus of One Variable I
16

Second Semester
4 - CH 102 General Chemistry
3 - ENGL 102 Composition II
4 - GEOL 102 Historical Geology
4 - MTHSC 108 Calculus of One Variable II
15

Sophomore Year

First Semester
4 - BIOL 103 General Biology I
4 - GEOL 302 Structural Geology
4 - MTHSC 206 Calculus of Several Variables
3 - Literature Requirement[1]
15

Second Semester
4 - BIOL 104 General Biology II
3 - CP SC 110 Elementary Computer Prog. *or*
3 - CP SC 111 Elem. Comp. Prog. in C/C++
3 - EN SP 200 Intro. to Environmental Science
4 - GEOL 306 Mineralogy
3 - PHYS 122 Physics with Calculus I
17

Junior Year

First Semester
3 - GEOL 314 Sedimentary Petrology *or*
GEOL 316 Igneous and Metamorphic Petrol.
3 - GEOL 318 Introduction to Geochemistry
3 - SPCH 250 Public Speaking
3 - Environmental Science Requirement[2]
3 - Social Science Requirement[3]
15

Second Semester
3 - ENGL 314 Technical Writing
3 - EX ST 301 Introductory Statistics
3 - GEOL 300 Environmental Geology
3 - Environmental Science Requirement[2]
3 - Humanities Requirement E.2[3]
15

Summer

6 - Summer Geology Field Course[4]

Senior Year

First Semester
3 - EN SP 400 Studies in Environmental Sciences
3 - GEOL 408 Geohydrology
6 - Environmental Science Requirement[2]
4 - Elective
16

Second Semester
3 - GEOL 405 Geomorphology
3 - Environmental Science Requirement[2]
3 - Social Science Requirement[3]
6 - Elective
15

130 Total Semester Hours

[1]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.
[2]Select from departmental list of approved courses. A minimum of 15 credits is required.
[3]See General Education Requirements.
[4]GEOL 475 or select from departmental list.

GEOLOGY

Bachelor of Arts

Freshman Year

First Semester
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
1 - GEOL 100 Current Topics in Geology
3 - GEOL 101 Physical Geology
1 - GEOL 103 Physical Geology Lab.
3 - Mathematical Sciences Requirement[1]
15

Second Semester
4 - CH 102 General Chemistry
3 - ENGL 102 Composition II
4 - GEOL 102 Historical Geology
3 - Mathematical Sciences Requirement[1]
3 - Elective
17

Sophomore Year

First Semester
4 - GEOL 302 Structural Geology
3 - HIST 172 Western Civilization
3 - SPCH 250 Public Speaking
4 - Foreign Language Requirement[2]
3 - Literature Requirement[3]
17

Second Semester
4 - GEOL 306 Mineralogy
3 - HIST 173 Western Civilization
3 - Computer Skills Requirement[4]
4 - Foreign Language Requirement[2]
3 - Literature Requirement[3]
17

Junior Year

First Semester
3 - Foreign Language Requirement[2]
6 - Major[5]
3 - Minor
3 - Elective
15

Second Semester
3 - ENGL 314 Technical Writing
3 - Foreign Language Requirement[2]
3 - Major[5]
3 - Minor
3 - Elective
15

Senior Year

First Semester
3 - Major[5]
6 - Minor
3 - Technical Requirement[6]
4 - Elective
16

Second Semester
6 - Major[5]
3 - Minor
3 - Technical Requirement[6]
4 - Elective
16

128 Total Semester Hours

[1]See General Education Requirements. MTHSC 106 and 108 are recommended.
[2]German or French is recommended. Two years of the same language are required.
[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.
[4]See General Education Requirements. CP SC 110 or 111 is recommended.
[5]Select from any 300- or 400-level geology courses.
[6]Choose from departmental list of approved courses.

MATHEMATICAL SCIENCES

Bachelor of Science

The Mathematical Sciences curriculum is designed to be versatile. Students gain a broad knowledge of mathematical concepts and methods that are applicable in sciences, engineering, business, industry, and other professions desiring a strong mathematical background. In addition to the basic courses which provide necessary mathematical skills, the curriculum allows students to select an emphasis area or concentration, providing an introduction to a specific area where mathematics is applied. These are Applied Analysis, Biology, Computer Science, Operations Research/Management Science, and Statistics.

In addition to the overall goal of preparing students to cope with a variety of mathematical problems, the curriculum seeks to provide an adequate background for students who plan to pursue graduate study or positions in business, industry, or government. Students electing the Biology Concentration will have the necessary preparation for entering medical school. More information about the degree program can be found at our Web site at www.math.clemson.edu.

Freshman Year

First Semester
3 - ECON 200 Economic Concepts *or*
3 - ECON 211 Principles of Microeconomics
3 - ENGL 101 Composition I
3 - HIST 172 or 173 Western Civilization
4 - MTHSC 106 Calculus of One Variable I
4 - Foreign Language Requirement[1]
17

Second Semester
3 - CP SC 120 Intro. to Information Technology
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
3 - MTHSC 129 Prob. Solving in Discrete Math.
4 - Foreign Language Requirement[1]
17

Sophomore Year

First Semester
4 - MTHSC 206 Calculus of Several Variables
1 - MTHSC 250 Intro. to Mathematical Sciences
3 - MTHSC 360 Intermediate Math. Computing
3 - Literature Requirement[2]
4 - Science Requirement[3]
15

Second Semester
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - MTHSC 311 Linear Algebra
3 - PHYS 122 Physics with Calculus I
3 - Literature Requirement[2]
4 - Science Requirement[3]
17

Junior Year

First Semester
3 - MTHSC 302 Statistics for Science and Engr.
3 - MTHSC 440 Linear Programming
4-3 - Approved Requirement[4]
3 - Emphasis Area
3-4 - Science Requirement[3]
16

Second Semester
3 - MTHSC 400 Theory of Probability
3 - MTHSC 412 Introduction to Modern Algebra
4-3 - Approved Requirement[4]
3 - Emphasis Area
3-4 - Science Requirement[3]
16

Senior Year

First Semester
3 - ENGL 314 Technical Writing
3 - MTHSC 450 Intro. to Mathematical Models
3 - MTHSC 453 Advanced Calculus I *or*
3 - MTHSC 463 Mathematical Analysis I
3 - SPCH 250 Public Speaking
4 - Approved Requirement[4]
3 - Emphasis Area
19

Second Semester
3 - MTHSC 454 Advanced Calculus II
3 - Emphasis Area
10 - Elective
16

133 Total Semester Hours

EMPHASIS AREAS

Operations Research/Management Science[3]
3 - I E 482 Systems Modeling *or*
3 - I E 384 Engineering Economic Analysis
3 - I E 486 Production Planning and Control *or*
3 - MGT 402 Operations Planning and Cont.
3 - MTHSC 407 Regress. and Time-Ser. Analysis
3 - MTHSC 441 Intro. to Stochastic Models
3 - MTHSC 460 Intro. to Numerical Analysis I
15

Statistics
3 - MA SC 414 Statistical Analysis
3 - MTHSC 403 Intro. to Statistical Theory
3 - MTHSC 406 Sampling Theory and Methods
3 - MTHSC 407 Regress. and Time-Ser. Analysis
12

Applied Analysis
3 - MTHSC 435 Complex Variables
3 - MTHSC 460 Intro. to Numerical Analysis I
6 - Applications Area[5]
12

[1]Eight semester hours in the same language are required.

[2]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[3]Must include two of the following sequences: BIOL 103/104; CH 101/102; ECON 314/405; PHYS 221/223, 222/224. The Operations Research/Management Science emphasis area requires ECON 314/405.

[4]Must be approved by the advisor.

[5]See advisor. Possibilities include CH 331, 332; E M 320; PHYS 321, 322, 441, 442.

Notes:

1. For graduation, a candidate for the BS degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required courses taught by the Mathematical Sciences Department including approved mathematical sciences electives and emphasis area courses.
2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.

BIOLOGY CONCENTRATION

Freshman Year

First Semester
5 - BIOL 110 Principles of Biology I[1]
3 - CP SC 120 Intro. to Information Technology
3 - ENGL 101 Composition I
4 - MTHSC 106 Calculus of One Variable I
15

Second Semester
5 - BIOL 111 Principles of Biology II[1]
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
3 - MTHSC 129 Prob. Solving in Discrete Math.
1 - MTHSC 250 Intro. to Mathematical Sciences
16

Sophomore Year

First Semester
4 - CH 101 General Chemistry
4 - MTHSC 206 Calculus of Several Variables
3 - MTHSC 360 Intermediate Math. Computing
4 - PHYS 207 General Physics I
3 - Literature Requirement[2]
18

Second Semester
4 - CH 102 General Chemistry
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - MTHSC 311 Linear Algebra
4 - PHYS 208 General Physics II
3 - Literature Requirement[2]
18

Junior Year

First Semester
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
3 - MTHSC 302 Statistics for Science and Engr.
3 - MTHSC 440 Linear Programming
4 - Foreign Language Requirement[3]
2 - Elective
16

Second Semester
3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
3 - MTHSC 400 Theory of Probability
3 - MTHSC 412 Introduction to Modern Algebra
4 - Foreign Language Requirement[3]
2 - Elective
16

Senior Year

First Semester
3 - ECON 200 Economic Concepts *or*
3 - ECON 211 Principles of Microeconomics
3 - MTHSC 450 Intro. to Mathematical Models
3 - MTHSC 453 Advanced Calculus I *or*
3 - MTHSC 463 Mathematical Analysis I
3 - Animal or Plant Diversity Requirement[4]
4 - Elective
16

Second Semester
3 - ENGL 314 Technical Writing
3 - HIST 172 or 173 Western Civilization
3 - MTHSC 454 Advanced Calculus II
3 - SPCH 250 Public Speaking
4-3 - Biological Science Requirement[5]
2-3 - Elective
18

133 Total Semester Hours

[1]Those qualifying for advanced placement in languages or wanting to take languages the freshman year may take them in place of these courses.

[2]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[3]Eight semester hours in the same language are required.

[4]Select from BIOSC 302, 303, 304, 305.

[5]Select from BIOCH 301, GEN 302, MICRO 305 or any 300- and 400-level biological science course.

Notes:

1. For graduation, a candidate for the BS degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required courses taught by the Mathematical Sciences Department including approved mathematical sciences electives and option courses.
2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.

COMPUTER SCIENCE CONCENTRATION

Freshman Year

First Semester
3 - ECON 200 Economic Concepts *or*
3 - ECON 211 Principles of Microeconomics
3 - ENGL 101 Composition I
3 - HIST 172 or 173 Western Civilization
4 - MTHSC 106 Calculus of One Variable I
4 - Foreign Language Requirement[1]
17

Second Semester
3 - CP SC 111 Elem. Computer Prog. in C/C++
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
3 - MTHSC 129 Prob. Solving in Discrete Math.
4 - Foreign Language Requirement[1]
17

Sophomore Year

First Semester
4 - CP SC 210 Programming Methodology
4 - MTHSC 206 Calculus of Several Variables
1 - MTHSC 250 Intro. to Mathematical Sciences
3 - Literature Requirement[2]
4 - Science Requirement[3]
16

Second Semester
3 - CP SC 340 Algorithms and Data Structures
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - MTHSC 311 Linear Algebra
3 - Literature Requirement[2]
4 - Science Requirement[3]
17

Junior Year

First Semester
3 - MTHSC 302 Statistics for Science and Engr.
3 - MTHSC 360 Intermediate Math. Computing
3 - MTHSC 440 Linear Programming
3 - PHYS 122 Physics with Calculus I
3-4 - Science Requirement[3]
15-16

Second Semester
3 - ENGL 314 Technical Writing
3 - MTHSC 400 Theory of Probability
3 - MTHSC 412 Introduction to Modern Algebra
3 - SPCH 250 Public Speaking
3-4 - Computer Science Requirement[4]
3-4 - Science Requirement[3]
18-20

Senior Year

First Semester
3 - MTHSC 450 Intro. to Mathematical Models
3 - MTHSC 453 Advanced Calculus I *or*
3 - MTHSC 463 Mathematical Analysis I
3 - MTHSC 460 Intro. to Numerical Analysis I
7-9 - Approved Requirement[5]
16-18

Second Semester
3 - MTHSC 454 Advanced Calculus II
3 - Computer Science Requirement[4]
10 - Elective
16

132-137 Total Semester Hours

[1]Eight semester hours in the same language are required.

[2]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[3]Must include two of the following sequences: BIOL 103/104; CH 101/102; ECON 314/405; PHYS 221/ 223, 222/224.

[4]One of the following sequences: CP SC 231/428; 350/450; 360/462 or any two courses from CP SC 231, 350, 360, 372.

[5]Must be approved by the advisor.

Notes:

1. For graduation, a candidate for the BS degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required courses taught by the Mathematical Sciences Department including approved mathematical sciences electives and concentration courses.
2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.

MATHEMATICAL SCIENCES

Bachelor of Arts

Freshman Year

First Semester
3 - ECON 200 Economic Concepts *or*
3 - ECON 211 Principles of Microeconomics
3 - ENGL 101 Composition I
3 - HIST 172 Western Civilization
4 - MTHSC 106 Calculus of One Variable I
4 - Foreign Language Requirement[1]
17

Second Semester
3 - CP SC 120 Intro. to Information Technology
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
3 - MTHSC 129 Prob. Solving in Discrete Math.
4 - Foreign Language Requirement[1]
17

Sophomore Year

First Semester
4 - MTHSC 206 Calculus of Several Variables
1 - MTHSC 250 Intro. to Mathematical Sciences
3 - Foreign Language Requirement[1]
3 - Literature Requirement[2]
4 - Science Requirement[3]
15

Second Semester
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - MTHSC 311 Linear Algebra
3 - Foreign Language Requirement[1]
3 - Literature Requirement[2]
4 - Science Requirement[3]
17

Junior Year

First Semester
3 - A A H 210 Intro. to Art and Architecture *or*
3 - MUSIC 210 Music Appreciation
3 - MTHSC 302 Statistics for Science and Engr.
3 - SPCH 250 Public Speaking
3 - Minor
3 - Social Science Requirement[3]
2 - Elective
17

Second Semester
3 - HIST 173 Western Civilization
3 - MTHSC 400 Theory of Probability
3 - MTHSC 412 Introduction to Modern Algebra
3 - Minor
3 - Social Science Requirement[3]
2 - Elective
17

Senior Year

First Semester
3 - MTHSC 440 Linear Programming *or*
3 - MTHSC 450 Intro. to Math. Models
3 - MTHSC 453 Advanced Calculus I *or*
3 - MTHSC 463 Mathematical Analysis I
6 - Minor
3 - Elective
15

Second Semester
3 - ENGL 314 Technical Writing
3 - MTHSC 454 Advanced Calculus II
3 - Humanities Requirement[3]
3 - Mathematical Sciences Requirement[4]
3 - Minor
3 - Elective
18

133 Total Semester Hours

[1]Four semesters of the same language.

[2]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[3]See advisor.

[4]Select from 300- and 400-level MTHSC courses with approval of advisor.

Notes:

1. For graduation, a candidate for the BA degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required courses taught by the Mathematical Sciences Department including approved mathematical sciences requirements and concentration/emphasis area courses.
2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.

PHYSICS

Bachelor of Science

Physics, the most fundamental of the natural sciences, forms the basis of study upon which the other branches of science are founded. Physics is concerned with the fundamental behavior of matter and energy. Classical physics encompasses the fields of mechanics, heat and thermodynamics, electricity and magnetism, acoustics and optics. Modern physics is concerned with the study of atoms and molecules, atomic nuclei, elementary particles and the properties of liquids, crystalline solids, and other materials, as well as the areas of relativity, cosmology, and the large-scale structure of the universe.

The undergraduate Physics curricula are designed to provide students with a strong background in the classical areas of physics as well as an introduction into the more important aspects of modern physics. The BS in Physics curriculum is directed toward preparing students for graduate study ultimately leading to the PhD degree or toward research and development work in industrial or governmental laboratories. It also provides a good background for graduate study or industrial work in many areas or engineering physics and applied science.

Freshman Year

First Semester
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
4 - MTHSC 106 Calculus of One Variable I
1 - PHYS 101 Current Topics in Modern Physics
3 - Social Science Requirement[1]
15

Second Semester
4 - CH 102 General Chemistry
3 - CP SC 120 Intro. to Information Technology
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
1 - PHYS 124 Physics Lab. I
18

Sophomore Year

First Semester
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
1 - PHYS 223 Physics Lab. II
4 - Foreign Language Requirement[2]
3 - Literature Requirement[3]
15

Second Semester
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - PHYS 222 Physics with Calculus III
1 - PHYS 224 Physics Lab. III
4 - Foreign Language Requirement[2]
3 - Humanities Requirement[1]
3 - Elective
18

Junior Year

First Semester
3 - PHYS 311 Intro. to Meth. of Theoretical Phys.
3 - PHYS 321 Mechanics I
3 - PHYS 325 Experimental Physics I
3 - Emphasis Area[4]
3 - Writing Intensive Requirement[1]
15

Second Semester
3 - PHYS 322 Mechanics II
3 - PHYS 326 Experimental Physics II
3 - PHYS 355 Modern Physics
3 - PHYS 441 Electromagnetics I
3 - Emphasis Area[4]
3 - Elective
18

Senior Year

First Semester
3 - PHYS 401 Senior Thesis
3 - PHYS 442 Electromagnetics II
3 - PHYS 455 Quantum Physics I
3 - Emphasis Area[4]
3 - Social Science Requirement[1]
15

Second Semester
3 - PHYS 465 Thermodynamics and Statistical Mechanics
3 - Emphasis Area[4]
3 - Oral Communication Requirement[1]
3 - Science Requirement[5]
4 - Elective
16

130 Total Semester Hours

[1]See General Education Requirements. (Social Science requirement must include either HIST 172 or 173.)

[2]Two semesters in same modern foreign language.

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]Select from Chemistry, Computer Science, Engineering, Environmental Science, Geology, Mathematical Sciences, and Physics and Astronomy. Students take a total of 12 credits in one of these areas, at least six of which will normally be at the 300–400 level. It should be noted that the requirements for a minor in one of these areas might be satisfied with three additional credits at the 300–400 level.

[5]The Science Requirement will be fulfilled by courses in the disciplines listed in (4) above at the 300–400 level in a discipline other than that chosen for the emphasis area.

BIOPHYSICS CONCENTRATION

The Biophysics Concentration offers an excellent preparation for medical school or graduate work in biological sciences. It includes the flexibility of selecting courses in chemistry, biological sciences, physics, and mathematics. This concentration also provides the necessary background for employment in industry, manufacturing, and instrumentation for clinical or molecular biology applications.

Freshman Year

First Semester
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
4 - MTHSC 106 Calculus of One Variable I
1 - PHYS 101 Current Topics in Modern Physics
3 - Social Science Requirement[1]
15

Second Semester
4 - CH 102 General Chemistry
3 - CP SC 120 Intro. to Information Technology
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
1 - PHYS 124 Physics Lab. I
18

Sophomore Year

First Semester
5 - BIOL 110 Principles of Biology I
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
1 - PHYS 223 Physics Lab. II
3 - Literature Requirement[2]
16

Second Semester
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - PHYS 222 Physics with Calculus III
1 - PHYS 224 Physics Lab. III
4 - Biophysics Requirement[3]
3 - Humanities Requirement E.2[1]
3 - Elective
18

Junior Year

First Semester
3 - PHYS 311 Intro. to Meth. of Theoretical Phys.
3 - PHYS 321 Mechanics I
3 - PHYS 325 Experimental Physics I
3 - Biophysics Requirement[3]
4 - Foreign Language Requirement[4]
16

Second Semester
3 - PHYS 322 Mechanics II
3 - PHYS 355 Modern Physics
3 - PHYS 441 Electromagnetics I
3 - Biophysics Requirement[3]
4 - Foreign Language Requirement[4]
16

Senior Year

First Semester
3 - PHYS 442 Electromagnetics II
3 - PHYS 455 Quantum Physics I
3 - Biophysics Requirement[3]
3 - Writing Intensive Requirement[1]
3 - Elective
15

Second Semester
3 - PHYS 465 Thermodynamics and Stat. Mech.[5]
3 - Biophysics Requirement[3]
3 - Oral Communication Requirement[1]
3 - Social Science Requirement[1]
4 - Elective
16

130 Total Semester Hours

[1]See General Education Requirements.

[2]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[3]Select from a list of approved courses in physics, chemistry, mathematics, and the biological sciences. At least six credits must be in the biological sciences.

[4]Two semesters in the same modern foreign language.

[5]An approved physics course may be substituted for PHYS 465 if the student satisfactorily completes CH 331, 332.

PHYSICS

Bachelor of Arts

The BA in Physics program is ideal for students interested in acquiring a broad-based liberal education that includes a strong and solid understanding of either science or a broad exposure to engineering with a strong physics foundation.

Freshman Year

First Semester
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
4 - MTHSC 106 Calculus of One Variable I
1 - PHYS 101 Current Topics in Modern Physics
3 - Social Science Requirement[1]
15

Second Semester
4 - CH 102 General Chemistry
3 - CP SC 120 Intro. to Information Technology
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
1 - PHYS 124 Physics Lab. I
18

Sophomore Year

First Semester
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
1 - PHYS 223 Physics Lab. II
4 - Foreign Language Requirement[2]
3 - Literature Requirement[3]
15

Second Semester
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - PHYS 222 Physics with Calculus III
1 - PHYS 224 Physics Lab. III
4 - Foreign Language Requirement[2]
3 - Humanities Requirement E.2[1]
3 - Elective
18

Junior Year

First Semester
3 - PHYS 311 Intro. to Meth. of Theoretical Phys.
3 - PHYS 321 Mechanics I
3 - Foreign Language Requirement[2]
3 - Minor
3 - Writing Intensive Requirement[1]
15

Second Semester
3 - PHYS 322 Mechanics II
3 - PHYS 355 Modern Physics
3 - PHYS 441 Electromagnetics I
3 - Foreign Language Requirement[2]
3 - Minor
15

Senior Year

First Semester
3 - PHYS 325 Experimental Physics I
6 - Minor
3 - Physics Requirement[4]
3 - Social Science Requirement[1]
3 - Elective
18

Second Semester
3 - Minor
3 - Oral Communication Requirement[1]
3 - Physics Requirement[4]
3 - Social Science Requirement[1]
4 - Elective
16

130 Total Semester Hours

[1]See General Education Requirements. (Social science requirement must include either HIST 172 or 173.)

[2]Four semesters in the same modern foreign language.

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]See advisor.

TEXTILES, FIBER, AND POLYMER SCIENCE

Textile students study the production, structure, and properties of natural and man-made fibers, the processes for converting these fibers into a textile structure, the science of coloring agents and finishes to improve the desirability and serviceability of the product, and the methods for evaluating the performance of textile materials.

Graduates of the School of Textiles, Fiber, and Polymer Science hold jobs in corporate and personnel management, manufacturing management, design, research, development, technical service, quality control, and sales. They create new products and processes and solve problems. They create styles, patterns, textures, and colors for apparel, home, industry, and special applications. Their jobs utilize computers, automation, and product quality and are concerned with plant design, environmental control, and consumer safety.

The textile industry has a continuing need for technically trained men and women to help the industry reduce costs and increase exports and to develop new materials. In the textiles curricula a broad background is stressed, with as much as two-thirds of the courses coming from the diverse resources of the University outside the School of Textiles, Fiber, and Polymer Science.

The School offers two undergraduate degrees which differ in their focus and course content. The Bachelor of Science in Polymer and Textile Chemistry is based on chemistry, physics, and mathematics. With this firm base, graduates are able to apply their scientific knowledge to the solution of problems in textile materials involving both chemical and physical principles. Graduates will be concerned with the conception, design, construction, and management of complete systems of labor, machinery, and processes for the most efficient production of textiles or related chemicals. There are two primary emphasis areas in Polymer and Textile Chemistry. Both allow students to prepare for graduate study in Textiles, Fiber, and Polymer Science as well as other disciplines.

The Bachelor of Science in Textile Management provides students with a balanced combination of the principles and theories of textile manufacturing and management, as well as concentrated studies in related options of the students' choice. This program prepares students for careers in the modern industrial environment by maximizing students' leadership potential and professional development in their chosen fields.

No new students are currently being accepted into the Textile Science major. Students interested in Textile Science are encouraged to major in Polymer and Textile Chemistry.

The School of Textiles, Fiber, and Polymer Science also offers advanced degrees: Master of Science in Textiles, Fiber, and Polymer Science; Doctor of Philosophy in Textiles, Fiber, and Polymer Science; and, in cooperation with the Chemistry Department, the Doctor of Philosophy in Chemistry with a major in Textile Chemistry.

Textile courses also may be taken as a minor area or as electives. Recommended groups of courses may consist of 3, 6, 12, or 20 credits.

POLYMER AND TEXTILE CHEMISTRY

Bachelor of Science

Freshman Year

First Semester
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
4 - MTHSC 106 Calculus of One Variable I
3 - TEXT 175 Intro. to Textile Manufacturing
3 - History Requirement[1]
17

Second Semester
4 - CH 102 General Chemistry
3 - CP SC 110 Elem. Computer Programming *or*
3 - CP SC 120 Intro. to Info. Technology
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
17

Sophomore Year

First Semester
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
1 - PHYS 223 Physics Lab. II
4 - Emphasis Area[2]
3 - Literature Requirement[3]
15

Second Semester
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - PHYS 222 Physics with Calculus III
1 - PHYS 224 Physics Lab. III
4 - Emphasis Area[2]
3 - Humanities Requirement E.2[4]
15

Junior Year

First Semester
3 - ECON 200 Economic Concepts
3 - T C 415 Intro. to Polymer Science and Engr.
1 - T C 417 Polymer and Fiber Lab.
4 - TEXT 201 Yarn Structures and Formation
3 - Emphasis Area[2]
3 - Elective
17

Second Semester
3 - ENGL 314 Technical Writing
3 - T C 416 Chemical Preparation of Textiles
4 - TEXT 202 Fabric Struc., Design, and Analysis
3 - Emphasis Area[2]
4 - Elective
17

Senior Year

First Semester
3 - T C 457 Dyeing and Finishing I
1 - T C 459 Dyeing and Finishing Lab. I
3 - TEXT 421 Fiber Science
3 - TEXT 428 Textile Research
7 - Approved Requirement[5]
17

Second Semester
3 - SPCH 250 Public Speaking *or*
3 - SPCH 251 Business and Prof. Speaking
3 - TEXT 422 Properties of Textile Structures
4-5 - Approved Requirement[5]
4-3 - Emphasis Area[2]
3 - Elective
17

132 Total Semester Hours

[1]Select from HIST 101, 102, 172, 173.

[2]Textile Chemistry—CH 223/227, 224/228, 331, 332, TC 458/460

Textile and Fiber Science—TC 303/305, 304/306, TEXT 403, 411, 414 or 416

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]See General Education Requirements.

[5]See advisor.

TEXTILE MANAGEMENT
Bachelor of Science

Freshman Year

First Semester
4 - CH 101 General Chemistry *or*
4 - CH 105 Beg. Gen. and Organic Chemistry
3 - ENGL 101 Composition I
3 - MTHSC 102 Intro. to Mathematical Analysis
3 - TEXT 175 Intro. to Textile Manufacturing
3 - History Requirement[1]
16

Second Semester
4 - CH 102 General Chemistry *or*
4 - CH 106 Beg. Gen. and Organic Chemistry
3 - CP SC 110 Elem. Computer Programming *or*
3 - CP SC 120 Intro. to Info. Technology
3 - ENGL 102 Composition II
3 - MTHSC 207 Multivariable Calculus
4 - TEXT 176 Natural and Man-made Fibers
17

Sophomore Year

First Semester
3 - ACCT 201 Financial Accounting Concepts
3 - ECON 200 Economic Concepts
3 - PSYCH 201 Introduction to Psychology
4 - TEXT 201 Yarn Structures and Formation
3 - Humanities Requirement E.2[2]
16

Second Semester
3 - ACCT 202 Managerial Accounting Concepts
3 - MGT 301 Principles of Management
3 - SPCH 250 Public Speaking *or*
3 - SPCH 251 Business and Prof. Speaking
4 - TEXT 202 Fabric Struc., Design, and Analysis
3 - Literature Requirement[3]
16

Junior Year

First Semester
3 - FIN 306 Corportation Finance
3 - LAW 322 Legal Environment of Business
3 - MKT 301 Principles of Marketing
4 - Concentration[4]
3 - Emphasis Area[5]
16

Second Semester
3 - ENGL 314 Technical Writing
3 - MGT 307 Personnel Management
7 - Concentration[4]
3 - Emphasis Area[5]
16

Senior Year

First Semester
3 - TEXT 324 Textile Statistics
3 - TEXT 470 Text. Cost. and Inventory Control
6-7 - Concentration[4]
3 - Emphasis Area[5]
3 - Elective
18-19

Second Semester
3 - MGT 415 Business Strategy
4-3 - Concentration[4]
3 - Emphasis Area[5]
7 - Elective
17-16

132 Total Semester Hours

[1]Select from HIST 101, 102, 172, or 173.

[2]See General Education Requirements.

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]**Concentration**—For either Concentration, the listed 21 hours are required:

Chemical—T C 303/305, 304/306, 405, 406, 416, 457/459.

Manufacturing—TEXT 308, 314, 403, 411, 422, 426, 429.

[5]**Emphasis Area**—A minimum of 12 credits must be selected with at least nine credits from any one of the following:

Computer Science—CP SC 130, 210, 330, 360, 462, MGT 218.

Industrial Engineering—E G 209, I E 488, MGT 402, 408.

Markets and Marketing—ECON 314, 412, MKT 302, 423, 424, 426, 431, 450, TEXT 472.

Personnel—ECON 301, 308, LAW 312, 313, 401, MGT 400, 416.

Product Development and Merchandising—TEXT 333, 472, 475, MKT 302, 423, 425.

Science—T C 303/305, 304/306, MTHSC 106, 108, 206, 208, PHYS 122, 221, 222, 223, 224.

Textile Specialties—TEXT 414, 416, 421, 471, 475, 476.

MINORS

Following are minors acceptable for students in the College of Engineering and Science. Students cannot major and minor in the same field or acquire a minor that is not allowed by the degree program.

Accounting
Adult/Extension Education
Aerospace Studies
African American Studies
Agricultural Business Management
Agricultural Mechanization and Business
Anthropology
Aquaculture, Fisheries, and Wildlife Biology
Beef Cattle Production
Biochemistry
Bioengineering
Biological Sciences
Business Administration
Chemistry
Cluster
Communications
Computer Science—*not open to Computer Information Systems majors*
Crop and Soil Environmental Science
Economics
Elementary Education
English
Entomology
Entrepreneurship
Environmental Engineering
Environmental Science and Policy
Film Studies
Financial Management
Fine Arts
Food Science
Forest Products
Forest Resource Management
Geography
Geology
Great Works
Health Science
History
Horse Production
Horticulture
Human Resource Management
International Engineering and Science
International Politics
Legal Studies
Management
Marketing
Mathematical Sciences
Microbiology
Military Science
Modern Languages
Music
Natural Resource Economics
Operations Management
Packaging Science
Parks, Recreation, and Tourism Management
Philosophy
Physics
Plant Pathology
Political Science
Poultry Science
Psychology
Public Policy—*not open to Mechanical Engineering majors*
Religion
Science and Technology in Society
Screenwriting
Secondary Education
Sociology
Spanish-American Area Studies
Speech and Communication Studies
Textiles—*not open to Polymer and Textile Chemistry or Textile Management majors*
Theatre
Urban Forestry
Women's Studies
Writing

See pages 30-33 for details.

COLLEGE OF HEALTH, EDUCATION, AND HUMAN DEVELOPMENT

The College of Health, Education, and Human Development oversees academic programs offered by the School of Nursing; the School of Education; the Department of Public Health Sciences; the Department of Parks, Recreation, and Tourism Management; the Department of Family and Youth Development; the National Dropout Prevention Center; and the Joseph F. Sullivan Center for Nursing and Wellness. Preparation of professional leaders in the health, education, nursing, recreation, park management, and tourism services is the primary focus of the College. The educational resources of Clemson's other colleges are integrated into these curricular areas, providing students with the breadth as well as the depth to be successful professionals within their chosen fields.

SCHOOL OF EDUCATION

The mission of the School of Education is to prepare outstanding, reflective practitioners in education and human resource development through the provision of diverse experiences in content, method, and research that empower professionals to be effective members of the communities in which they live and serve. The School of Education trains teachers, counselors, and leaders for the K–12 schools and training and development specialists for business and industry.

TEACHER EDUCATION PROGRAMS

The School of Education embraces its conceptual framework of empowered professionals educating a diverse world. These professionals utilize the knowledge of curriculum, technology, assessment, and instructional/leadership/counseling strategies to effect learning for diverse populations. Clemson provides resources for courses and clinical experiences in method, research, and content knowledge which produce reflective practitioners who are knowledgeable, ethical, caring decision makers responding to local, state, and world needs.

The Teacher Education Programs prepare teachers, provide professional services to education in South Carolina, and carry out basic and applied research in education. Curricula are designed to provide a broad general education through liberal arts and science courses, develop depth of knowledge in the teaching area, gain an understanding of the historical, philosophical, and psychological backgrounds of American education, and acquire knowledge of and skill and experience in effective teaching techniques.

The Teacher Education Programs are accredited by the National Council for the Accreditation of Teacher Education (NCATE) for the preparation of educational personnel in South Carolina in Early Childhood, Elementary, and Special Education and secondary school programs in Agriculture, Technology Education, Biological Sciences, Physical Sciences, Earth Sciences, Mathematics, English, History and Geography, Political Science and Economics, and Psychology and Sociology.

Admission

Professional. Application to the professional level of a program will be processed during the term in which a student is to complete 60 semester hours of work. At that time, the student will be notified of his/her status by the College's Academic Advising Center. Prior to admission, the student must have passed all areas of the Praxis 1 Pre-Professional Skills Test (PPST) and have a minimum cumulative grade-point ratio of 2.5.

Directed Teaching. A student shall apply to the field experience director prior to the semester in which directed teaching is to be scheduled. The following conditions must be met prior to registration for directed teaching: (1) admission to the professional level of a program; (2) completion of at least 95 semester hours; (3) a minimum cumulative grade-point ratio of 2.5.

Enrollment in Professional Courses

Enrollment in 400-level professional education courses is contingent upon admission to the professional level as described above. Any student who desires to enroll in education courses must meet the cumulative grade-point requirements established for education majors. A student who is denied admission may appeal to the Education Admissions Committee.

Graduation

To graduate, a student must have a score report for all state-mandated certification exams on file with the Academic Advising Center in the College of Health, Education, and Human Development.

Graduate Study

Clemson University offers programs leading to the Master of Education, Master of Human Resource Development, Master of Industrial Education, Specialist in Education, Doctor of Education, and Doctor of Philosophy degrees.

AGRICULTURAL EDUCATION

Bachelor of Science

The College of Health, Education, and Human Development and the College of Agriculture, Forestry, and Life Sciences conduct a cooperative program to produce agricultural teachers (grades 9–12) for South Carolina. (See the Agricultural Education curriculum on page 35.)

EARLY CHILDHOOD EDUCATION

Bachelor of Arts

The Early Childhood Education curriculum prepares students for teaching positions on the kindergarten and primary levels (grades K–4).

Freshman Year

First Semester

1 - ED 100 Orientation
3 - ENGL 101 Composition I
3 - MTHSC 115 Contemporary Mathematics for Elementary School Teachers I
4 - PH SC 108 Introduction to Physical Science
4 - Foreign Language Requirement[1]
15

Second Semester

3 - ENGL 102 Composition II
3 - HIST 172 Western Civilization
3 - MTHSC 116 Contemporary Mathematics for Elementary School Teachers II
4 - PH SC 107 Introduction to Earth Science
4 - Foreign Language Requirement[1]
17

Sophomore Year

First Semester

4 - BIOL 109 Introduction to Life Science
3 - HIST 173 Western Civilization
3 - Arts and Humanities Requirement[2]
3 - Foreign Language Requirement[1]
3 - Literature Requirement[3]
3 - Elective
19

Second Semester

3 - CP SC 120 Intro. to Information Technology
3 - ED F (AG ED, THRD) 480 Educational Applications of Microcomputers
3 - ED F 301 Principles of American Education
3 - ED F 334 Child Growth and Development
3 - Arts and Humanities Requirement[2]
3 - Foreign Language Requirement[1]
3 - Elective
18

Junior Year

First Semester

3 - ED F 302 Educational Psychology
3 - ED SP 370 Introduction to Special Education
3 - ENGL 385 Children's Literature
3 - SPCH 150 Intro. to Speech Communication *or*
3 - SPCH 250 Public Speaking
3 - THRD 310 Arts and Creat. for Elem. Child
3 - Education Requirement[4]
18

Second Semester

3 - ED 466 Intro. to Early Childhood Education
1 - ED F (THRD) 315 Integrating Computers into the Classroom
3 - ED F 336 Behavior of the Preschool Child[5]
3 - ED F 458 Health Education
3 - GEOG 101 Introduction to Geography *or*
3 - GEOG 103 World Regional Geography
4 - Elective
17

Senior Year

(Courses must be taken as listed in both semesters.)

First Semester

3 - ED 321 Physical Education Methods for Classroom Teachers
3 - ED 400 Early Childhood Education Field Exp.
3 - ED 483 Meth. and Mat. for Early Child. Educ.
3 - ED 488 Teach. Lang. Arts in the Elem. School
3 - READ 459 Teaching Reading in the Early Grades: K–3

15

Second Semester

12 - ED 484 Dir. Teaching in Early Child. Educ.

12

131 Total Semester Hours

[1]Two years of the same foreign language are required.

[2]HUM 301 and 302; or select three credits from two of the following fields:

Art—A A H 210

Music—MUSIC 210 or 311 or 400

Theatre—THEA 210 or 372

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]Select from ED 451, 452, 487, 460.

[5]To be taken prior to or in the same semester as ED 466.

ELEMENTARY EDUCATION

Bachelor of Arts

The Elementary Education curriculum prepares students for teaching on the elementary school level (grades 1–8).

Freshman Year

First Semester

1 - ED 100 Orientation
3 - ENGL 101 Composition I
3 - MTHSC 115 Contemporary Mathematics for Elementary School Teachers I
4 - PH SC 108 Introduction to Physical Science
4 - Foreign Language Requirement[1]

15

Second Semester

3 - ENGL 102 Composition II
3 - HIST 172 Western Civilization
3 - MTHSC 116 Contemporary Mathematics for Elementary School Teachers II
4 - PH SC 107 Introduction to Earth Science
4 - Foreign Language Requirement[1]

17

Sophomore Year

First Semester

4 - BIOL 109 Introduction to Life Science
3 - HIST 173 Western Civilization
3 - MTHSC 216 Geom. for Elem. School Teachers
3 - Arts and Humanities Requirement[2]
3 - Foreign Language Requirement[1]
3 - Literature Requirement[3]

19

Second Semester

3 - CP SC 120 Intro. to Information Technology
3 - ED F (AG ED, THRD) 480 Educational Applications of Microcomputers
3 - ED F 334 Child Growth and Development
3 - GEOG 101 Introduction to Geography *or*
3 - GEOG 103 World Regional Geography
3 - SPCH 150 Intro. to Speech Communication *or*
3 - SPCH 250 Public Speaking
3 - Arts and Humanities Requirement[2]
3 - Foreign Language Requirement[1]

18

Junior Year

First Semester

3 - ED 321 Physical Education Methods for Classroom Teachers
3 - ED F 301 Principles of American Education
3 - ED F 302 Educational Psychology
3 - ED F 458 Health Education
3 - ENGL 385 Children's Literature
4 - Elective

19

Second Semester

3 - ED 452 Elem. Methods in Math. Teaching
1 - ED F (THRD) 315 Integrating Computers into the Classroom
3 - ED SP 370 Introduction to Special Education
3 - READ 459 Teaching Reading in the Early Grades: K–3
3 - THRD 310 Arts and Creat. for Elemen. Child
6 - Elective

19

Senior Year

(Courses must be taken as listed in both semesters.)

First Semester

3 - ED 401 Elementary Field Experience
3 - ED 451 Elem. Methods in Science Teaching
3 - ED 487 Teach. Soc. Studies in the Elem. Sch.
3 - ED 488 Teach. Lang. Arts in the Elem. School
3 - READ 460 Teaching Reading in the Intermediate Grades 4–8

15

Second Semester

12 - ED 481 Dir. Teaching in the Elem. School

12

134 Total Semester Hours

[1]Two years of the same foreign language are required.

[2]HUM 301 and 302; or select three credits from two of the following fields:

Art—A A H 210

Music—MUSIC 210 or 311 or 400

Theatre—THEA 210 or 372

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

MATHEMATICS TEACHING

Bachelor of Science

The program leading to a Bachelor of Science degree in Mathematics Teaching is designed for students planning to teach mathematics on the secondary school level (grades 9–12).

Freshman Year

First Semester

4 - BIOL 103 General Biology I
4 - CH 105 Beg. General and Organic Chemistry
1 - ED 100 Orientation
3 - ENGL 101 Composition I
4 - MTHSC 106 Calculus of One Variable I
2 - Elective

18

Second Semester

4 - BIOL 104 General Biology II
4 - CH 106 Beg. Gen. and Organic Chemistry
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
3 - Elective

18

Sophomore Year

First Semester

3 - CP SC 120 Intro. to Information Technology
3 - HIST 172 Western Civilization
4 - MTHSC 206 Calculus of Several Variables
4 - PHYS 207 General Physics I
3 - Literature Requirement[1]

17

Second Semester

3 - CP SC 111 Elem. Computer Prog. in C/C++ *or*
3 - MTHSC 360 Inter. Math. Computing
3 - ED F 302 Educational Psychology
3 - HIST 173 Western Civilization
3 - HUM 301 or 302 Humanities[2]
4 - PHYS 208 General Physics II
2 - Elective

18

Junior Year

First Semester

3 - ED F 301 Principles of American Education
3 - MTHSC 301 Statistical Theory and Methods I
3 - MTHSC 308 College Geometry
3 - Mathematics Requirement[3]
3 - Social Science Requirement[4]
3 - Elective

18

Second Semester

3 - ED 426 Teaching Secondary Mathematics[5]
1 - ED F (THRD) 315 Integrating Computers into the Classroom
3 - MTHSC 311 Linear Algebra
3 - MTHSC 408 Topics in Geometry
3 - READ 498 Secondary Content Area Reading[5]
3 - Social Science Requirement[4]

16

Senior Year

(Directed Teaching—Either Semester)

First Semester

3 - ED F 335 Adolescent Growth and Dev.
3 - ENGL 314 Technical Writing
3 - MTHSC 412 Introduction to Modern Algebra
3 - MTHSC 453 Advanced Calculus I
3 - SPCH 150 Intro. to Speech Comm. *or*
3 - SPCH 250 Public Speaking
3 - Mathematics Requirement[3]
18

Second Semester

12 - ED 412 Directed Teaching
3 - ED SP 370 Introduction to Special Education
15

138 Total Semester Hours

[1]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[2]May be satisfied by completing A A H 210 and MUSIC 210 or 311. In this case, the additional three credits will be recorded as electives.

[3]Any 200–400-level MTHSC course, except MTHSC 207, 210, 215, 216.

[4]Select from courses in ECON (including AP EC 202), GEOG, PO SC, PSYCH, SOC.

[5]To be taken the semester prior to Directed Teaching.

SCIENCE TEACHING

Bachelor of Science

The program leading to a Bachelor of Science degree in Science Teaching is designed for students planning to teach biological sciences, chemistry, earth sciences, or physical sciences on the secondary school level (grades 9–12). The required science electives are included to give some degree of competency in a field other than the major area. Students are urged to discuss the PRAXIS with their advisor upon completion of the sophomore year.

TEACHING AREA: BIOLOGICAL SCIENCES

Freshman Year

First Semester

4 - CH 101 General Chemistry
3 - CP SC 120 Intro. to Information Technology
3 - ENGL 101 Composition I
3 - HIST 172 Western Civilization
4 - MTHSC 106 Calculus of One Variable I
17

Second Semester

4 - CH 102 General Chemistry
1 - ED 100 Orientation
3 - ENGL 102 Composition II
3 - HIST 173 Western Civilization
3 - MTHSC 301 Stat. Theory and Methods I *or*
4 - MTHSC 108 Calculus of One Variable II
3 - Elective
17-18

Sophomore Year

First Semester

5 - BIOL 110 Principles of Biology I
4 - CH 201 Survey of Organic Chemistry *or*
3 - CH 330 Intro. to Physical Chemistry
3 - ED F 301 Principles of American Education
1 - ED F (THRD) 315 Integrating Computers into the Classroom
4 - PHYS 207 General Physics I
16-17

Second Semester

5 - BIOL 111 Principles of Biology II
3 - ED F 302 Educational Psychology
4 - PHYS 208 General Physics II
3 - SPCH 150 Intro. to Speech Communication *or*
3 - SPCH 250 Public Speaking
3 - Literature Requirement[1]
18

Junior Year

First Semester

3 - BIOCH 210 Elementary Biochemistry *and*
1 - BIOCH 211 Elementary Biochemistry Lab. *or*
3 - BIOCH 301 General Biochemistry *and*
1 - BIOCH 302 Molecular Biology Lab.
4 - BIOSC 222 Human Anatomy and Phys. I
3 - ED F 335 Adolescent Growth and Dev.
4 - GEN 302 Genetics
4 - Elective
19

Second Semester

4 - BIOSC 223 Human Anatomy and Phys. II
3 - ENGL 314 Technical Writing
3 - HUM 301 or 302 Humanities
4 - Plant Diversity Requirement[2]
3 - Social Science Requirement[3]
17

Senior Year

(Directed Teaching—Either Semester)

First Semester

3 - ED 427 Teaching Secondary Science[4]
3 - READ 498 Secondary Content Area Reading[4]
4 - Animal Diversity Requirement[5]
3-4 - Biology Requirement[6]
3 - Social Science Requirement[3]
3 - Elective
19-20

Second Semester

12 - ED 412 Directed Teaching
3 - ED SP 370 Introduction to Special Education
15

138-141 Total Semester Hours

[1]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[2]Select from BIOSC 304/308 or 305/309.

[3]Select from courses in ANTH, ECON, GEOG, PO SC, PSYCH, SOC.

[4]To be taken semester immediately prior to student teaching.

[5]Select from BIOSC 302/306 or 303/307.

[6]Select from BIOSC 320, 335, 336, 420, 470, 491.

Note: This curriculum leads to South Carolina certification to teach all science subjects in grades 7–12 and provides special expertise for teaching middle school life science and senior high school biological sciences.

TEACHING AREA: EARTH SCIENCES

Freshman Year

First Semester

4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
3 - GEOL 101 Physical Geology
1 - GEOL 103 Physical Geology Lab.
3 - HIST 172 Western Civilization
4 - MTHSC 106 Calculus of One Variable I
18

Second Semester

4 - CH 102 General Chemistry
1 - ED 100 Orientation
3 - ENGL 102 Composition II
4 - GEOL 102 Historical Geology
3 - HIST 173 Western Civilization
3 - MTHSC 301 Stat. Theory and Methods I
18

Sophomore Year

First Semester

4 - BIOL 103 General Biology I
3 - ED F 301 Principles of American Education
3 - ENGL 314 Technical Writing
1 - GEOL 100 Current Topics in Geology
4 - GEOL 302 Structural Geology
3 - Literature Requirement[1]
18

Second Semester

4 - BIOL 104 General Biology II
3 - CP SC 120 Intro. to Information Technology
3 - ED F 302 Educational Psychology
4 - GEOL 306 Mineralogy
3 - PHYS 240 Physics of the Weather
17

Junior Year

First Semester

3 - ASTR 101 Solar System Astronomy
1 - ASTR 103 Solar System Astronomy Lab.
3 - ED F 335 Adolescent Growth and Dev.
4 - PHYS 207 General Physics
3 - Social Science Requirement[2]
4 - Elective
18

Second Semester

3 - ASTR 102 Stellar Astronomy
1 - ASTR 104 Stellar Astronomy Lab.
1 - ED F (THRD) 315 Integrating Computers into the Classroom
4 - PHYS 208 General Physics II
3 - SPCH 150 Intro. to Speech Communication *or*
3 - SPCH 250 Public Speaking
3 - Geology Requirement[3]
3 - Elective
18

Senior Year

First Semester

3 - ED 427 Teaching Secondary Science[4]
3 - HUM 301 or 302 Humanities
3 - READ 498 Secondary Content Area Reading[4]
3-4 - Geology Requirement[3]
3 - Social Science Requirement[2]
3 - Elective

18-19

Second Semester

12 - ED 412 Directed Teaching
3 - ED SP 370 Introduction to Special Education

15

140-141 Total Semester Hours

[1]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[2]Select from courses in ANTH, ECON, GEOG, PO SC, PSYCH, SOC.

[3]Select from GEOL 300, 302, 314, 316, 318, 403, 405. (Each course may be taken only once.)

[4]To be taken semester immediately prior to student teaching; offered fall semester only.

Note: This curriculum leads to South Carolina certification to teach all science subjects in grades 7–12 and provides special expertise for teaching middle and secondary earth and environmental sciences.

TEACHING AREA: PHYSICAL SCIENCES

Freshman Year

First Semester

4 - CH 101 General Chemistry
3 - CP SC 120 Issues in Computers
3 - ENGL 101 Composition I
3 - HIST 172 Western Civilization
4 - MTHSC 106 Calculus of One Variable I

17

Second Semester

4 - CH 102 General Chemistry
2 - CH 205 Introduction to Inorganic Chemistry
1 - ED 100 Orientation
3 - ENGL 102 Composition II
3 - HIST 173 Western Civilization
4 - MTHSC 108 Calculus of One Variable II

17

Sophomore Year

First Semester

4 - BIOL 103 General Biology I
4 - CH 201 Survey of Organic Chemistry
3 - ED F 301 Principles of American Education
3 - MTHSC 301 Statistical Theory and Methods I
1 - PHYS 101 Current Topics in Modern Physics
3 - SPCH 150 Intro. to Speech Communication *or*
3 - SPCH 250 Public Speaking

18

Second Semester

4 - BIOL 104 General Biology II
3 - CH 330 Intro. to Physical Chemistry
3 - ED F 302 Educational Psychology
3 - ENGL 314 Technical Writing
3 - PHYS 122 Physics with Calculus I
1 - PHYS 124 Physics Lab. I

17

Junior Year

First Semester

3 - ED F 335 Adolescent Growth and Dev.
3 - HUM 301 or 302 Humanities
3 - PHYS 221 Physics with Calculus II
1 - PHYS 223 Physics Lab. II
3-4 - Astronomy Requirement[1]
4 - Elective

17-18

Second Semester

1 - ED F (THRD) 315 Integrating Computers into the Classroom
3 - PHYS 222 Physics with Calculus III
1 - PHYS 224 Physics Lab. III
3 - PHYS 240 Physics of the Weather
3 - Literature Requirement[2]
3 - Social Science Requirement[3]
3 - Elective

17

Senior Year

(Directed Teaching—Either Semester)

First Semester

3 - CH 313 Quantitative Analysis
1 - CH 317 Quantitative Analysis Lab.
3 - ED 427 Teaching Secondary Science[4]
3 - READ 498 Secondary Content Area Reading[4]
2-4 - Physics Requirement[5]
3 - Social Science Requirement[3]
3 - Elective

18-20

Second Semester

12 - ED 412 Directed Teaching
3 - ED SP 370 Introduction to Special Education

15

136-139 Total Semester Hours

[1]ASTR 101/103 or ASTR (GEOL) 220.

[2]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[3]Select from courses in ANTH, ECON, GEOG, PO SC, PSYCH, SOC.

[4]To be taken semester immediately prior to student teaching.

[5]Select from ASTR 302, 303, PHYS 290, 311, 452.

Note: This curriculum leads to South Carolina certification to teach all science subjects in grades 7–12 and provides special expertise for teaching secondary school chemistry, physics, and physical sciences.

SECONDARY EDUCATION

Bachelor of Arts

The Bachelor of Arts degree in Secondary Education is available to students preparing to teach English, history/geography, mathematics, modern languages (French, German, Spanish), political science/economics, and psychology/sociology on the secondary school level (grades 9–12). The teaching field should be selected as early as possible so that appropriate freshman and sophomore courses may be taken.

Each curriculum requires a major concentration in the teaching field. Specific courses and sequences have been designated to meet requirements for those planning to teach. Students who have elective courses in the teaching area should consult their advisors prior to scheduling these courses.

The professional education courses should be completed in sequence. Application to Directed Teaching (ED 412) should be made in writing no later than May 1 preceding the school year in which student teaching is to be scheduled. ED 412 is conducted on a full-day basis for one semester.

TEACHING AREA: ENGLISH

Freshman Year

First Semester

3 - ENGL 101 Composition I
3 - MTHSC 101 Introduction to Probability
3 - Computer Skills Requirement[1]
4 - Foreign Language Requirement[2]
4 - Science Requirement[1]

17

Second Semester

1 - ED 100 Orientation
3 - ENGL 102 Composition II
3 - HIST 172 Western Civilization
3 - MTHSC 102 Intro. to Mathematical Analysis
4 - Foreign Language Requirement[2]
4 - Science Requirement[1]

18

Sophomore Year

First Semester

3 - ED F 301 Principles of American Education
3 - ENGL 202 Major Forms of Literature
3 - HIST 173 Western Civilization
3 - SPCH 150 Intro. to Speech Communication *or*
3 - SPCH 250 Public Speaking
3 - Foreign Language Requirement[2]
3 - Social Science Requirement[3]

18

Second Semester

3 - ED F 302 Educational Psychology
3 - ENGL 209 Contemporary Literature
3 - ENGL 353 Ethnic American Literature
3 - Foreign Language Requirement[2]
3 - Social Science Requirement[3]
3 - Elective

18

Junior Year

First Semester

1 - ED F (THRD) 315 Integrating Computers into the Classroom
3 - ED F 335 Adolescent Growth and Dev.
3 - HIST 365 English Cultural History
3 - HUM 301 or 302 Humanities[4]
6 - Teaching Major[5]

16

Second Semester

3 - ED 424 Teaching Secondary English[6]
3 - READ 498 Secondary Content Area Reading[6]
9 - Teaching Major[5]
3 - Elective

18

Senior Year
(Directed Teaching—Either Semester)

First Semester
3 - ED SP 370 Introduction to Special Education
9 - Teaching Major[5]
4 - Elective
16

Second Semester
12 - ED 412 Directed Teaching
12

133 Total Semester Hours

[1]See General Education Requirements.

[2]Two years of the same language are required.

[3]Select from courses in ANTH, ECON (including AP EC 202), GEOG, PO SC, PSYCH, SOC.

[4]May be satisfied by completing A A H 210 and MUSIC 210 or 311. In this case, the additional three credit hours will be recorded as electives.

[5]ENGL 209, 353, and 24 credits of junior and senior English courses as follows: ENGL 386; 400; 401; 405 or 406; 411; 422, 423, 424 or 425; 435; 485.

[6]To be taken in the semester preceding Directed Teaching.

TEACHING AREA: HISTORY AND GEOGRAPHY

Freshman Year

First Semester
1 - ED 100 Orientation
3 - ENGL 101 Composition I
3 - MTHSC 101 Introduction to Probability
4 - Foreign Language Requirement[1]
4 - Science Requirement[2]
2 - Elective
17

Second Semester
3 - ENGL 102 Composition II
3 - HIST 172 Western Civilization
3 - MTHSC 102 Intro. to Mathematical Analysis
4 - Foreign Language Requirement[1]
4 - Science Requirement[2]
17

Sophomore Year

First Semester
3 - CP SC 120 Intro. to Information Technology *or*
  3 - ED F (AG ED, THRD) 480 Educational Applications of Microcomputers
3 - GEOG 101 Introduction to Geography *or*
  3 - GEOG 103 World Regional Geography
3 - HIST 173 Western Civilization
3 - SOC 201 Introduction to Sociology
3 - Foreign Language Requirement[1]
3 - Literature Requirement[3]
18

Second Semester
3 - ED F 301 Principles of American Education
3 - HIST 101 History of the United States
3 - Foreign Language Requirement[1]
3 - Writing Intensive Requirement[2]
6 - Elective
18

Junior Year

First Semester
3 - ED F 302 Educational Psychology
3 - ED F 335 Adolescent Growth and Dev.
3 - HIST 102 History of the United States
9 - Teaching Major[4]
18

Second Semester
3 - ED 428 Teaching Secondary Social Studies[5]
1 - ED F (THRD) 315 Integrating Computers into the Classroom
3 - READ 498 Secondary Content Area Reading[5]
3 - SPCH 150 Intro. to Speech Communication *or*
  3 - SPCH 250 Public Speaking
6 - Teaching Major[4]
2 - Elective
18

Senior Year
(Directed Teaching—Either Semester)

First Semester
3 - ECON 200 Economic Concepts
3 - HUM 301 or 302 Humanities[6]
3 - PO SC 101 Intro. to American Politics
9 - Teaching Major[5]
18

Second Semester
12 - ED 412 Directed Teaching
3 - ED SP 370 Introduction to Special Education
15

139 Total Semester Hours

[1]Two years of the same language are required.

[2]See advisor. Select from General Education courses.

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]Twenty-four credit hours of 300- and 400-level courses as follows: 18 credit hours from history and six credit hours from geography. Must be selected with the consent of advisor and include at least three hours in each of the following categories: U. S. history or geography, European history or geography, Third World or non-European history or geography. At least six hours must be at the 400 level. HIST 313 is recommended for those planning to teach in South Carolina.

[5]To be taken in the semester preceding Directed Teaching.

[6]May be satisfied by completing A A H 210 and MUSIC 210 or 311. In this case, the additional three credit hours will be recorded as electives.

TEACHING AREA: MATHEMATICS

Freshman Year

First Semester
4 - BIOL 103 General Biology I
1 - ED 100 Orientation
3 - ENGL 101 Composition I
4 - MTHSC 106 Calculus of One Variable I
4 - Foreign Language Requirement[1]
16

Second Semester
4 - BIOL 104 General Biology II
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
4 - Foreign Language Requirement[1]
3 - Elective
18

Sophomore Year

First Semester
3 - CP SC 120 Intro. to Information Technology
4 - MTHSC 206 Calculus of Several Variables
3 - Foreign Language Requirement[1]
3 - Literature Requirement[2]
3 - Science Requirement[3]
2 - Elective
18

Second Semester
3 - CP SC 111 Elem. Computer Prog. in C/C++ *or*
  3 - MTHSC 360 Inter. Math. Computing
3 - ED F 302 Educational Psychology
3 - HIST 172 Western Civilization
3 - Foreign Language Requirement[1]
3 - Science Requirement[3]
3 - Social Science Requirement[4]
18

Junior Year

First Semester
3 - ED F 301 Principles of American Education
1 - ED F (THRD) 315 Integrating Computers into the Classroom
3 - HIST 173 Western Civilization
3 - MTHSC 301 Statistical Theory and Methods I
3 - MTHSC 308 College Geometry
3 - Social Science Requirement[4]
2 - Elective
18

Second Semester
3 - ED 426 Teaching Secondary Mathematics[5]
3 - HUM 301 or 302 Humanities[6]
3 - MTHSC 311 Linear Algebra
3 - MTHSC 408 Topics in Geometry
3 - READ 498 Secondary Content Area Reading[5]
3 - Elective
18

Senior Year
(Directed Teaching—Either Semester)

First Semester
3 - ED F 335 Adolescent Growth and Dev.
3 - ENGL 314 Technical Writing
3 - MTHSC 412 Introduction to Modern Algebra
3 - MTHSC 453 Advanced Calculus I
3 - SPCH 250 Public Speaking
3 - Mathematics Requirement[7]
18

Second Semester
12 - ED 412 Directed Teaching
3 - ED SP 370 Introduction to Special Education
15

139 Total Semester Hours

[1]Two years of the same language are required.

[2]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[3]Select form courses in ASTR, CH, GEOL, PHYS.

[4]Select from courses in ECON (including AP EC 202), GEOG, PO SC, PSYCH, SOC.

[5]To be taken in the semester preceding Directed Teaching.

[6]May be satisfied by completing A A H 210 and MUSIC 210 or 311. In this case, the additional three credit hours will be recorded as electives.

[7]Any 200–400-level mathematics course, except MTHSC 207, 210, 216.

TEACHING AREA: MODERN LANGUAGES

(French, German, and Spanish)

Freshman Year

First Semester

1 - ED 100 Orientation
3 - ENGL 101 Composition I
3 - MTHSC 101 Introduction to Probability
4 - Foreign Language Requirement[1]
4 - Science Requirement[2]
15

Second Semester

3 - ENGL 102 Composition II
3 - HIST 172 Western Civilization
3 - MTHSC 102 Intro. to Mathematical Analysis
4 - Foreign Language Requirement[1]
4 - Science Requirement[2]
17

Sophomore Year

First Semester

3 - ED F 302 Principles of American Education
3 - HIST 173 Western Civilization
3 - Computer Skills Requirement[2]
3 - Foreign Language Requirement[1]
3 - Literature Requirement[3]
15

Second Semester

3 - ED F 302 Educational Psychology
3 - Foreign Language Requirement[1]
3 - Literature Requirement[3]
3 - Social Science Requirement[4]
6 - Elective
18

Junior Year

First Semester

3 - ED F 335 Adolescent Growth and Dev.
3 - Social Science Requirement[4]
9 - Teaching Major[5]
3 - Elective
18

Second Semester

1 - ED F (THRD) 315 Integrating Computers into the Classroom
3 - SPCH 150 Intro. to Speech Communication *or* 3 - SPCH 250 Public Speaking
9 - Teaching Major[5]
3 - Elective
16

Senior Year

(Directed Teaching—Either Semester)

First Semester

3 - ED 425 Teach. Secondary Modern Languages[6]
3 - HUM 301 or 302 Humanities[7]
3 - READ 498 Secondary Content Area Reading[6]
6 - Teaching Major[5]
3 - Writing Intensive Requirement[2]
18

Second Semester

12 - ED 412 Directed Teaching
3 - ED SP 370 Introduction to Special Education
15

132 Total Semester Hours

[1]Two years of the same language are required.

[2]See General Education Requirements.

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]Select from courses in ANTH, ECON (including AP EC 202), GEOG, PO SC, PSYCH, SOC.

[5]Requires 24 credits in French, German, or Spanish as listed.

French—FR 409 and 21 credits arranged as follows:

Group I—FR 300, 305, 307, 309.

Group II—Nine credits at the 400 level, including at least one 400-level literature course.

German—GER 305, 411, and 18 credits arranged as follows:

Group I—12 credits from GER 301, 302, 308, 316, 412, 416.

Group II—Six credits from GER 401, 402, 403, 413.

Spanish—24 credits arranged as follows:

Group I—SPAN 303 or 404 and 311 (preferably in sequence).

Group II—SPAN 305, 307, 308.

Group III—SPAN 401, 409.

Group IV—Three credits from 300–400 level courses.

[6]To be taken the semester prior to Directed Teaching.

[7]May be satisfied by completing A A H 210 and MUSIC 210 or 311. In this case, the additional three credits will be recorded as electives.

TEACHING AREA: POLITICAL SCIENCE AND ECONOMICS

Freshman Year

First Semester

1 - ED 100 Orientation
3 - ENGL 101 Composition I
3 - HIST 172 Western Civilization
3 - MTHSC 101 Introduction to Probability
4 - Foreign Language Requirement[1]
4 - Science Requirement[2]
18

Second Semester

3 - ENGL 102 Composition II
3 - HIST 173 Western Civilization
3 - MTHSC 102 Intro. to Mathematical Analysis
4 - Foreign Language Requirement[1]
4 - Science Requirement[2]
17

Sophomore Year

First Semester

3 - HIST 101 History of the United States
3 - SOC 201 Introduction to Sociology
3 - Computer Skills Requirement[2]
3 - Foreign Language Requirement[1]
3 - Literature Requirement[3]
2 - Elective
17

Second Semester

3 - ECON 200 Economic Concepts[4]
3 - ED F 301 Principles of American Education
3 - HIST 102 History of the United States
3 - PO SC 101 Introduction to American Politics
3 - Foreign Language Requirement[1]
3 - Elective
18

Junior Year

First Semester

3 - ED F 302 Educational Psychology
1 - ED F (THRD) 315 Integrating Computers into the Classroom
3 - ED F 335 Adolescent Growth and Dev.
9 - Teaching Major[5]
2 - Elective
18

Second Semester

3 - ED 428 Teaching Secondary Social Studies[6]
3 - READ 498 Secondary Content Area Reading[6]
3 - SPCH 150 Intro. to Speech Communication *or* 3 - SPCH 250 Public Speaking
9 - Teaching Major[5]
18

Senior Year

(Directed Teaching—Either Semester)

First Semester

3 - GEOG 101 Introduction to Geography *or* 3 - GEOG 103 World Regional Geography
3 - HUM 301 or 302 Humanities[7]
6 - Teaching Major[5]
3 - Writing Intensive Requirement[2]
3 - Elective
18

Second Semester

12 - ED 412 Directed Teaching
3 - ED SP 370 Introduction to Special Education
15

139 Total Semester Hours

[1]Two years of the same language are required.

[2]See General Education Requirements.

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]ECON 211/212 may be substituted. In that case, the three extra hours will be credited as electives.

[5]Consists of 24 semester hours of 300- and 400-level courses selected from political science and economics (ECON 301, 302, 309, 310, 404 recommended) with no fewer than nine hours in each of these areas. Political science credits are to be drawn from at least three of the following fields:

American Governments—PO SC 403, 405, 432, 433, 442

Comparative Politics—PO SC 371, 373, 471, 476, 477

International Relations—PO SC 361, 362, 363, 428, 465

Political Theory—PO SC 451, 452, 453

Public Policy and Administration—PO SC 302, 321

[6]To be taken the semester preceding Directed Teaching.

[7]May be satisfied by completing A A H 210 and MUSIC 210 or 311. In this case, the additional three credit hours will be recorded as electives.

TEACHING AREA: PSYCHOLOGY AND SOCIOLOGY

Freshman Year

First Semester

1 - ED 100 Orientation
3 - ENGL 101 Composition I
3 - MTHSC 101 Introduction to Probability
4 - Foreign Language Requirement[1]
4 - Science Requirement[2]
2 - Elective
17

Second Semester
3 - ENGL 102 Composition II
3 - HIST 172 or 173 Western Civilization
3 - MTHSC 102 Intro. to Mathematical Analysis
4 - Foreign Language Requirement[1]
4 - Science Requirement[2]
17

Sophomore Year

First Semester
3 - GEOG 101 Introduction to Geography *or*
3 - GEOG 103 World Regional Geography
3 - HIST 101 History of the United States
3 - PSYCH 201 Introduction to Psychology
3 - Computer Skills Requirement[2]
3 - Foreign Language Requirement[1]
3 - Literature Requirement[3]
18

Second Semester
1 - ED F (THRD) 315 Integrating Computers into the Classroom
3 - HIST 102 History of the United States
3 - PO SC 101 Introduction to American Politics
3 - SOC 201 Introduction to Sociology
3 - SPCH 150 Intro. to Speech Communication *or*
3 - SPCH 250 Public Speaking
3 - Foreign Language Requirement[1]
2 - Elective
18

Junior Year

First Semester
3 - ED F 301 Principles of American Education
3 - ED F 302 Educational Psychology
3 - ED F 335 Adolescent Growth and Dev.
9 - Teaching Major[4]
18

Second Semester
3 - ECON 200 Economic Concepts
3 - ED 428 Teaching Secondary Social Studies[5]
3 - READ 498 Secondary Content Area Reading[5]
3 - Non-Western History Requirement[6]
6 - Teaching Major[4]
18

Senior Year

(Directed Teaching—Either Semester)

First Semester
3 - HUM 301 or 302 Humanities[7]
6 - Teaching Major[4]
3 - Writing Intensive Requirement[2]
6 - Elective
18

Second Semester
12 - ED 412 Directed Teaching
3 - ED SP 370 Introduction to Special Education
15

139 Total Semester Hours

[1]Two years of the same language are required.

[2]See General Education Requirements.

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]Consists of 21 semester hours of 300- and 400-level courses selected from sociology/anthropology and psychology with no fewer than nine hours in each of these two areas. Recommended courses include ANTH 301, 320; PSYCH 320, 330, 333, 340, 352, 370, 415; SOC 311, 392, 397, 460, 461, 481.

[5]To be taken in the semester preceding Directed Teaching.

[6]Select from HIST 330, 333, 338, 339, 340, 341, 342.

[7]May be satisfied by completing A A H 210 and MUSIC 210 or 311. In this case, the additional three credit hours will be recorded as electives.

SPECIAL EDUCATION

Bachelor of Arts

The Bachelor of Arts degree in Special Education prepares students to teach individuals with mild disabilities in grades K–12. The curriculum is designed to meet the competencies outlined by the Council for Exceptional Children for beginning special education teachers. Students completing the program receive instruction and practical experiences that lead to Generic Special Education Certification in South Carolina.

Freshman Year

First Semester
1 - ED 100 Orientation
3 - ENGL 101 Composition I
3 - MTHSC 115 Contemporary Mathematics for Elementary School Teachers I
4 - Foreign Language Requirement[1]
4 - Science Requirement[2]
1 - Elective
16

Second Semester
3 - ENGL 102 Composition II
3 - HIST 172 Western Civilization
3 - MTHSC 116 Contemporary Mathematics for Elementary School Teachers II
4 - Foreign Language Requirement[1]
4 - Science Requirement[2]
17

Sophomore Year

First Semester
1 - ED F (THRD) 315 Integrating Computers into the Classroom
3 - ED F 334 Child Growth and Development
3 - HIST 173 Western Civilization
3 - Foreign Language Requirement[1]
3 - Literature Requirement[3]
4 - Science Requirement[2]
17

Second Semester
3 - ED F 302 Educational Psychology
3 - ED SP 370 Introduction to Special Education
3 - GEOG 101 Introduction to Geography
3 - SPCH 150 Intro. to Speech Communication *or*
3 - SPCH 250 Public Speaking
3 - Computer Skills Requirement[4]
3 - Foreign Language Requirement[1]
18

Junior Year

First Semester
3 - ED F 301 Principles of American Education
3 - ED F 458 Health Education
3 - ED SP 372 Char. and Ident. of and Strategies for Individuals with Learning Disabilities[5]
3 - ED SP 373 Char. and Instruction of Individuals with Mental Retardation[5]
3 - READ 459 Teaching Reading in the Early Grades: K–3
3 - Elective
18

Second Semester
3 - ED 452 Elem. Methods in Math. Teaching
3 - ED 488 Teach. Lang. Arts in the Elem. School
3 - ED SP 374 Char. and Strategies for Individuals with Emotional/Behavioral Disorders[6]
3 - ED SP 491 Education Assessment of Individuals with Disabilities[6]
6 - Elective
18

Senior Year

First Semester
3 - ED SP 492 Mathematics Instruction for Individuals with Mild Disabilities[7]
3 - ED SP 493 Classroom and Behavior Management for Special Educators[7]
3 - ED SP 494 Teaching Reading to Students with Mild Disabilities[7]
3 - ED SP 496 Special Education Field Experience[7]
3 - ED SP 497 Secondary Methods for Individuals with Disabilities[7]
15

Second Semester
3 - ED SP 495 Communication and Collaboration for the Resource Teacher
12 - ED SP 498 Directed Teaching
15

134 Total Semester Hours

[1]Two years of the same foreign language are required.

[2]Three science courses (12 credit hours) composed of both biological and physical sciences are required. PH SC 108 and 107 and BIOL 109 are recommended. Eight of these hours must be a two-semester sequence.

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]See General Education Requirements.

[5]Must be taken during the fall semester of junior year.

[6]Must be taken during the spring semester of junior year.

[7]Courses must be taken concurrently during fall semester of senior year.

TECHNOLOGY AND HUMAN RESOURCE DEVELOPMENT

Bachelor of Science

The Bachelor of Science degree in Technology and Human Resource Development prepares students for professional teaching positions, as well as occupations in human resource development/industrial training in the private sector. To accomplish this, the curriculum is divided into four concentrations. By the end of the freshman year, each student must select one of the following concentrations: Customized Training and Development, Human Resource Development, Industrial Technology Education, or Vocational-Technical Education. Each curriculum requires 135 semester hours.

CUSTOMIZED TRAINING AND DEVELOPMENT CONCENTRATION

The Customized Training and Development concentration is specifically designed to facilitate the transfer of credit from approved associate degree programs into the Bachelor of Science degree in Technology and Human Resource Development. The curriculum builds upon the technical expertise gained in the associate programs to prepare individuals to become training specialists in business and industry. Students exit the program with skills related to analyzing needs; conducting job and task analyses; designing, marketing, and evaluating training programs; delivering professional presentations; and developing instructional materials.

Freshman Year

First Semester
3 - ENGL 101 Composition I
3 - Mathematical Sciences Requirement[1]
4 - Science Requirement[1]
3 - Technical Specialty Requirement[2]
3 - Elective
16

Second Semester
3 - ENGL 102 Composition II
3 - Mathematical Sciences Requirement[1]
4 - Science Requirement[1]
3 - Technical Specialty Requirement[2]
3 - Elective
16

Sophomore Year

First Semester
3 - Humanities Requirement E.1[1]
3 - Social Science Requirement[1]
6 - Technical Specialty Requirement[2]
4 - Elective
16

Second Semester
3 - Computer Skills Requirement[1]
3 - Humanities Requirement E.2[1]
3 - Social Science Requirement[1]
6 - Technical Specialty Requirement[2]
15

Summer

6 - THRD 390 Industrial Cooperative Experience I

Junior Year

First Semester
3 - MGT 307 Personnel Management
3 - THRD 360 Ind. Organizations and Safety
3 - Major Requirement[2]
3 - Oral Communication Requirement[1]
3 - Technical Specialty Requirement[2]
15

Second Semester
3 - PSYCH 364 Industrial Psychology *or*
    3 - PRTM 308 Lead. and Group Proc. in Rec.
3 - THRD 160 Training Programs in Industry
3 - Major Requirement[2]
3 - Technical Specialty Requirement[2]
3 - Writing Intensive Requirement[1]
15

Summer

6 - THRD 490 Industrial Coop. Experience II

Senior Year

First Semester
3 - THRD 460 Dev. Training Programs for Ind.
3 - THRD 468 Public Relations
6 - Major Requirement[2]
3 - Technical Specialty Requirement[2]
15

Second Semester
3 - MGT 400 Mgt. of Organizational Behavior *or*
    3 - MGT 416 Mgt. of Human Resources *or*
    3 - PSYCH 368 Organizational Psychology
3 - THRD 465 Conducting and Evaluating Training Programs for Industry
3 - THRD 486 Instructional Media Development
3 - Major Requirement[2]
3 - Technical Specialty Requirement[2]
15

135 Total Semester Hours

[1]See General Education Requirements.
[2]See advisor.

HUMAN RESOURCE DEVELOPMENT CONCENTRATION

The Human Resource Development concentration prepares students to enter industry or business as training and development specialists. The curriculum provides participants with a broad exposure to industrial processes in manufacturing, construction, power/transportation, and communications. Numerous hands-on experiences related to the application of technology in industry are integrated with valuable skills and knowledge from the training and development profession. Students exit the program with skills related to analyzing needs; conducting job and task analyses; designing, marketing, and evaluating training programs; delivering professional presentations; and developing instructional materials.

Freshman Year

First Semester
3 - ENGL 101 Composition I
3 - THRD 110 Intro. to Industrial Technology
3 - THRD 180 Introduction to Technical Drawing and Computer Aided Drafting
3 - Mathematical Sciences Requirement[1]
4 - Science Requirement[1]
16

Second Semester
3 - ENGL 102 Composition II
3 - THRD 160 Training Programs in Industry
3 - THRD 181 Advanced Technical Drawing and Computer-Aided Drafting
3 - Mathematical Sciences Requirement[1]
4 - Science Requirement[1]
16

Sophomore Year

First Semester
3 - ACCT 200 Basic Accounting *or*
    3 - ACCT 201 Financial Acct. Concepts
3 - CP SC 120 Intro. to Information Technology
3 - THRD 220 Manufacturing Tech. I: Systems
3 - THRD 230 Construction Tech. I: Materials
3 - Literature Requirement[2]
15

Second Semester
3 - ECON 200 Economic Concepts *or*
    3 - ECON 211 Principles of Microeconomics
3 - PSYCH 201 Introduction to Psychology
3 - SPCH 250 Public Speaking *or*
    3 - SPCH 251 Business and Prof. Speaking
3 - THRD 240 Power Technology I: Production
3 - THRD 280 Comm. Tech. I: Processes and Mat.
1 - Elective
16

Junior Year

First Semester
3 - ECON 301 Economics of Labor *or*
    3 - ECON 308 Collective Bargaining
3 - MGT 301 Principles of Management
3 - THRD 484 Comm. Technology II: Systems
3 - Humanities Requirement E.2[3]
3 - Major Requirement[4]
3 - Elective
18

Second Semester
3 - ENGL 314 Technical Writing
3 - MGT 307 Personnel Management
3 - THRD 360 Ind. Organizations and Safety
3 - THRD 430 Const. Tech. II: Practices and Syst.
3 - Major Requirement[4]
3 - Elective
18

Senior Year

First Semester
3 - THRD 440 Power Technology II
3 - THRD 460 Dev. Training Programs for Ind.
3 - THRD 468 Public Relations
3 - Communication Requirement[5]
3 - Major Requirement[4]
3 - Elective
18

Second Semester
3 - MGT 416 Mgt. of Human Resources *or*
3 - MGT 400 Mgt. of Organizational Behavior *or*
3 - PSYCH 368 Organizational Psychology
3 - PSYCH 364 Industrial Psychology *or*
3 - PSYCH 454 Psych. of Human Relation. *or*
3 - PRTM 308 Lead. and Group Proc. in Rec.
3 - THRD 420 Manuf. Tech. II: Mat. and Proc.
3 - THRD 465 Conducting and Evaluating Training Programs for Industry
3 - THRD 486 Instructional Media Development
3 - Major Requirement[4]
18

135 Total Semester Hours

[1]See General Education Requirements.
[2]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.
[3]Select from PHIL 324, 344, SPCH 365.
[4]See advisor; two technical courses must be represented.
[5]Select from ENGL 304, SPCH 340, 350, 360, 361, 364.
Note: One summer (400 clock hours) of field experience is required following the sophomore year.

INDUSTRIAL TECHNOLOGY EDUCATION CONCENTRATION

The Industrial Technology Education Concentration is for students who plan to teach industrial technology in the secondary schools (grades 6–12). Industrial technology is the subject area in the public school system which provides youth with an interpretation of American industry. It is a general education subject designed to give students exploratory experience in the classroom and laboratory. Majors in this concentration are qualified to seek certification as secondary school teachers of industrial technology.

Freshman Year

First Semester
1 - ED 100 Orientation
3 - ENGL 101 Composition I
3 - THRD 110 Intro. to Industrial Technology
3 - Mathematical Sciences Requirement[1]
4 - Science Requirement[2]
2 - Elective
16

Second Semester
3 - ENGL 102 Composition II
3 - THRD 180 Introduction to Technical Drawing and Computer-Aided Drafting
3 - Computer Skills Requirement[1]
3 - Mathematical Sciences Requirement[1]
4 - Science Requirement[2]
2 - Elective
18

Sophomore Year

First Semester
3 - HIST 173 Western Civilization
3 - THRD 220 Manufacturing Tech. I: Systems
3 - THRD 230 Construction Tech. I: Materials
3 - Literature Requirement[3]
4 - Science Requirement[2]
1 - Elective
17

Second Semester
3 - MUSIC 210 Music Appreciation: Music in the Western World
3 - SPCH 250 Public Speaking
3 - THRD 181 Advanced Technical Drawing and Computer-Aided Drafting
3 - THRD 240 Power Technology I: Production
3 - THRD 280 Comm. Tech. I: Processes and Mat.
3 - Social Science Requirement[1]
18

Junior Year

First Semester
3 - ED F 302 Educational Psychology
3 - ED F 458 Health Education
3 - THRD 440 Power Technology II
3 - THRD 484 Comm. Tech. II: Systems
3 - Writing Intensive Requirement[1]
2 - Elective
17

Second Semester
3 - A A H 210 Intro. to Art and Architecture
3 - ED F 335 Adolescent Growth and Dev.
3 - THRD 415 History and Philosophy of Industrial and Vocational Education *or*
3 - ED F 301 Prin. of American Education
3 - THRD 420 Manuf. Tech. II: Mat. and Proc.
3 - THRD 430 Const. Tech.II: Practices and Syst.
3 - Major Requirement[4]
18

Senior Year

First Semester
3 - ED SP 370 Introduction to Special Education
3 - THRD 470 Course Organization and Eval.
3 - THRD 471 Teaching Industrial Subjects
3 - Major Requirement[4]
4 - Elective
16

Second Semester
3 - THRD 371 Mgt. of Industrial Education Labs.
12 - THRD 477 Directed Teaching
15

135 Total Semester Hours

[1]See General Education Requirements.
[2]Both biological and physical laboratory sciences must be represented with an eight-credit sequence in one.
[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.
[4]Select from G C 207, 215, TEXT 333, 460, THRD 222, 224, 250, 281, 320, 441, 450, (AG ED, THRD) 480, (AG ED, THRD) 482, 483.

VOCATIONAL-TECHNICAL EDUCATION CONCENTRATION

The Vocational-Technical Education concentration prepares teachers of vocational and technical subjects in senior high schools, career centers, and technical education centers. Teachers graduating from this concentration possess the skills and knowledge required to teach the occupation or family of occupations in their area of specialization.

Freshman Year

First Semester
3 - ENGL 101 Composition I
3 - Mathematical Sciences Requirement[1]
4 - Science Requirement[1]
3 - Technical Specialty Requirement[2]
3 - Elective
16

Second Semester
3 - ENGL 102 Composition II
3 - Mathematical Sciences Requirement[1]
4 - Science Requirement[1]
3 - Technical Specialty Requirement[2]
3 - Elective
16

Sophomore Year

First Semester
3 - Humanities Requirement E.1[1]
3 - Social Science Requirement[1]
6 - Technical Specialty Requirement[2]
4 - Elective
16

Second Semester
3 - Computer Skills Requirement[1]
3 - Humanities Requirement E.2[1]
3 - Social Science Requirement[1]
6 - Technical Specialty Requirement[2]
15

Summer

6 - THRD 390 Industrial Cooperative Experience I

Junior Year

First Semester
3 - SPCH 250 Public Speaking
3 - THRD 370 Motivation and Disc. in Voc. Ed.
3 - Approved Requirement[3]
6 - Technical Specialty Requirement[2]
15

Second Semester
3 - THRD 371 Mgt. of Industrial Education Labs.
3 - Approved Requirement[3]
6 - Technical Specialty Requirement[2]
3 - Writing Intensive Requirement[1]
15

Summer

6 - THRD 490 Industrial Coop. Experience II

Senior Year

First Semester
3 - THRD 470 Course Organization and Eval.
3 - THRD 471 Teaching Industrial Subjects
3 - THRD 472 Advanced Instructional Methods
6 - THRD 478 Internship in Voc. Tech. Ed. I
15

Second Semester
3 - THRD 415 History and Philosophy of Industrial and Vocational Education *or*
3 - ED F 301 Prin. of American Education
3 - THRD 473 Competency Test. in Voc. Subjects
6 - THRD 479 Internship in Voc. Technical Ed. II
3 - THRD (AG ED, ED F) 480 Educational Applications of Microcomputers
15

135 Total Semester Hours

[1]See General Education Requirements.

[2]See advisor. Technical specialties must relate to one of the Trades and Industries programs recognized by the South Carolina Department of Education.

[3]See advisor.

HEALTH SCIENCE

Bachelor of Science

The Department of Public Health Sciences prepares students for careers in the health field, one of the largest industries in the United States. It includes hospitals and other medical service providers, public health organizations, health insurance companies, health/medical related sales, and community and non-profit health agencies.

Plans of study can be arranged in health promotion and education, health systems research, health information systems, and preprofessional health studies. Students in the Preprofessional Health Studies Concentration obtain the coursework and experience necessary for acceptance into various graduate programs in clinical health professions. Students in Health Promotion and Education have the skills to assess, plan, communicate, implement, manage, and evaluate public health promotion programs. Students in Health Systems Research have the skills to describe, evalute, design, and improve the performance of health systems. Students in Health Information Systems have skills in software and hardware design, information systems design and management and are able to apply these skills in health care settings.

Students enrolled in HLTH 402 must have proof of CPR Certification prior to registration.

HEALTH INFORMATION SYSTEMS CONCENTRATION

Freshman Year

First Semester
4 - CP SC 101 Computer Science I
3 - ENGL 101 Composition I
3 - HLTH 202 Introduction to Public Health
4 - MTHSC 106 Calculus of One Variable I
4 - Science Requirement[1]
18

Second Semester
4 - CP SC 102 Computer Science II
3 - ENGL 102 Composition II
4 - MTHSC 108 Calculus of One Variable II
4 - Science Requirement[1]
15

Sophomore Year

First Semester
1 - CP SC 221 Intro. to a Comp. Sci. Language
4 - CP SC 231 Intro. to Computer Organization
3 - HLTH 298 Human Health and Disease
3 - MTHSC 119 Intro. to Discrete Methods
3 - PHIL 326 Science and Values
3 - Elective
17

Second Semester
4 - CP SC 212 Algorithms and Data Structures
3 - ENGL 304 Business Writing *or*
3 - ENGL 314 Technical Writing
3 - HLTH 240 Determinants of Health Behavior
3 - MTHSC 301 Statistical Theory and Methods I
3 - Humanities Requirement E.1[2]
16

Junior Year

First Semester
3 - CP SC 360 Distributed and Network Prog.
3 - ECON 211 Principles of Microeconomics
3 - HLTH 303 Communication in Health Systems
1 - HLTH 419 Hlth. Sci. Internship Prep. Seminar
3 - HLTH 490 Res. and Eval. Strat. for Pub. Hlth.
3 - Oral Communication Requirement[2]
16

Second Semester
3 - CP SC 371 Systems Analysis
3 - CP SC 372 Intro. to Software Development
3 - HIST 172 or 173 Western Civilization
3 - HLTH 380 Epidemiology
3 - MGT 218 Mgt. Personal Computer Appl.
15

Summer

3 - HLTH 350 Medical Terminology and Comm.
4 - HLTH 420 Health Science Internship[3]
7

Senior Year

First Semester
3 - CP SC 462 Database Management Systems
3 - HLTH 315 Social Epidemiology
3 - HLTH 498 Improving Population Health
3 - MGT 418 Management Information Systems
3 - Cultural and Family Context Requirement[4]
15

Second Semester
3 - CP SC 463 Online Systems
3 - HLTH 440 Managing Health Service Org.
3 - HLTH 460 Health Information Systems
7 - Elective
16

135 Total Semester Hours

[1]See advisor. Select from BIOL 103/104, CH 101/102, or PHYS 122/124 and 221/223.

[2]See General Education Requirements.

[3]Internship must be completed in one or two semesters. Internship may be done fall, spring, and summer after completing HLTH 419. Prior approval is required for summer internships.

[4]Select from ANTH 201, 301, 351, SOC 201, 311, 460, 480.

Notes:

1. A minimum grade point ratio of 2.0 is required for registration in each health course.
2. Students must receive a minimum grade of C in all HLTH courses. Health courses may be repeated only once.

HEALTH PROMOTION AND EDUCATION CONCENTRATION

Freshman Year

First Semester
4 - BIOL 103 General Biology I
3 - ENGL 101 Composition I
3 - HLTH 202 Introduction to Public Health
4 - Chemistry Requirement[1]
3 - Computer Skills Requirement[2]
17

Second Semester
3 - ENGL 102 Composition II
3 - HIST 172 or 173 Western Civilization
4 - Chemistry Requirement[1]
3-4 - Mathematical Sciences Requirement[3]
3 - Social Science Requirement[4]
16-17

Sophomore Year

First Semester
4 - BIOSC 222 Human Anatomy and Phys. I
3 - HLTH 298 Human Health and Disease
3 - PHIL 326 Science and Values
3 - PSYCH 201 Introduction to Psychology
4 - Elective
17

Second Semester
4 - BIOSC 223 Human Anatomy and Phys. II
3 - ENGL 304 Business Writing *or*
3 - ENGL 314 Technical Writing
3 - HLTH 240 Determinants of Health Behavior
3 - Health Requirement[1]
3 - Social Science Requirement[4]
16

Junior Year

First Semester
3 - HLTH 303 Communication in Health Systems
3 - HLTH 340 Health Promotion and Education
1 - HLTH 398 Health Appraisal Skills
1 - HLTH 419 Hlth. Sci. Internship Prep. Seminar
3 - HLTH 490 Res. and Eval. Strat. for Pub. Hlth.
3 - NUTR 203 Principles of Human Nutrition
3 - Statistics Requirement[5]
17

Second Semester
3 - HLTH 380 Epidemiology
3 - HLTH 402 Principles of Health Fitness
3 - PSYCH 340 Lifespan Developmental Psych.
3 - Health Requirement[1]
3 - Oral Communication Requirement[2]
3 - Social Science Requirement[4]
18

Summer
4 - HLTH 420 Health Science Internship[6]

Senior Year
First Semester
3 - HLTH 315 Social Epidemiology
3 - HLTH 480 Community Health Promotion
3 - HLTH 498 Improving Population Health
3 - Cultural and Family Context Requirement[7]
3 - Elective
15

Second Semester
3 - HLTH 440 Managing Health Service Org.
3 - HLTH 450 Applied Health Strategies
3 - Concentration Area Requirement[1]
3 - Humanities Requirement E.1[2]
3 - Elective
15

135-136 Total Semester Hours

[1]See advisor.

[2]See General Education Requirements.

[3]Select from MTHSC 101, 102, 106.

[4]Select from ANTH 201, 301, 351, R S 301, (SOC) 459, SOC 201, 311.

[5]Select from EX ST 301, MTHSC 203, 301.

[6]Internship must be completed in one or two semesters. Internship may be done in fall, spring, and summer after completing HLTH 419. Prior approval is required for summer internships. 2.0 grade-point ratio required for registration.

[7]Select from ANTH 201, 301, 351, SOC 201, 311, 460, 480.

Notes:

1. A minimum grade-point ratio of 2.0 is required for registration in each health course.
2. Students must receive a minimum grade of C in all HLTH courses. Health courses may be repeated only once.

HEALTH SYSTEMS RESEARCH CONCENTRATION

Freshman Year
First Semester
3 - ENGL 101 Composition I
3 - HLTH 202 Introduction to Public Health
4 - MTHSC 106 Calculus of One Variable I
3 - Computer Skills Requirement[1]
4 - Science Requirement[2]
17

Second Semester
3 - ENGL 102 Composition II
3 - HIST 172 or 173 Western Civilization
4 - MTHSC 108 Calculus of One Variable II
3 - Cultural and Family Context Requirement[3]
4 - Science Requirement[2]
17

Sophomore Year
First Semester
3 - ECON 211 Principles of Microeconomics
3 - HLTH 298 Human Health and Disease
4 - MTHSC 206 Calculus of Several Variables
3 - PHIL 326 Science and Values
4 - Elective
17

Second Semester
3 - ECON 314 Intermediate Microeconomics
3 - ENGL 304 Business Writing *or*
3 - ENGL 314 Technical Writing
3 - HLTH 240 Determinants of Health Behavior
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - MTHSC 311 Linear Algebra
16

Junior Year
First Semester
3 - HLTH 303 Communication in Health Systems
1 - HLTH 419 Hlth. Sci. Internship Prep. Seminar
3 - HLTH 490 Res. and Eval. Strat. for Pub. Hlth.
3 - I E 380 Methods of Operational Research I
3 - MTHSC 302 Statistics for Science and Engr.
3 - Oral Communication Requirement[1]
16

Second Semester
3 - HLTH 380 Epidemiology
3 - I E 381 Methods of Operational Research II
3 - MTHSC 400 Theory of Probability
3 - Humanities Requirement E.1[1]
3 - Elective
15

Summer
4 - HLTH 420 Health Science Internship[4]

Senior Year
First Semester
3 - HLTH 315 Social Epidemiology
3 - HLTH (AP EC, C R D) 361 Introduction to Health-Care Economics
3 - HLTH 498 Improving Population Health
3 - I E 482 Systems Modeling
3 - MA SC 310 Intermediate Business Statistics
3 - Elective
18

Second Semester
3 - HLTH 440 Managing Health Service Org.
3 - HLTH 460 Health Information Systems
3 - HLTH 475 Health Systems Research
3 - MA SC 312 Decision Models for Management
3 - MTHSC 406 Sampling Theory and Methods *or*
3 - MTHSC 407 Regress. and Time-Series An.
15

135 Total Semester Hours

[1]See General Education Requirements.

[2]See advisor. Select from BIOL 103/104, CH 101/102, or PHYS 122/124 and 221/223.

[3]Select from ANTH 201, 301, 351, SOC 201, 311, 460, 480.

[4]Internship must be completed in one or two semesters. Internship may be done fall, spring, and summer after completing HLTH 419. Prior approval is required for summer internships.

Notes:

1. A minimum grade-point ratio of 2.0 is required for registration in each HLTH course.
2. Students must receive a minimum grade of C in all HLTH courses. Health courses may be repeated only once.

PREPROFESSIONAL HEALTH STUDIES CONCENTRATION

Freshman Year
First Semester
4 - BIOL 103 General Biology I *or*
5 - BIOL 110 Principles of Biology I
4 - CH 101 General Chemistry I
3 - ENGL 101 Composition I
3 - HLTH 202 Introduction to Public Health
3 - Computer Skills Requirement[1]
17-18

Second Semester
4 - BIOL 104 General Biology II *or*
5 - BIOL 111 Principles of Biology II
4 - CH 102 General Chemistry II
3 - ENGL 102 Composition II
3 - HIST 172 *or* 173 Western Civilization
3 - Mathematical Sciences Requirement[2]
17-18

Sophomore Year
First Semester
4 - BIOSC 222 Human Anatomy and Physiology I
3 - HLTH 298 Human Health and Disease
3 - PHIL 326 Science and Values
4 - Concentration Area Requirement[3]
3 - Statistics Requirement[4]
17

Second Semester
4 - BIOSC 223 Human Anatomy and Phys. II
3 - ENGL 304 Business Writing *or*
3 - ENGL 314 Technical Writing
3 - HLTH 240 Determinants of Health Behavior
4 - Concentration Area Requirement[3]
3 - Social Science Requirement[1]
17

Junior Year
First Semester
3 - HLTH 303 Communication in Health Systems
3 - HLTH 340 Health Promotion and Education
1 - HLTH 419 Hlth. Sci. Internship Prep. Seminar
3 - HLTH 490 Res. and Eval. Strat. for Pub. Hlth.
4 - PHYS 207 General Physics I
3 - Concentration Area Requirement[3]
17

Second Semester
3 - HLTH 380 Epidemiology
4 - PHYS 208 General Physics II
3 - Concentration Area Requirement[3]
3 - Oral Communication Requirement[1]
13

Summer
4 - HLTH 420 Health Science Internship[5]

Senior Year
First Semester
3 - HLTH 315 Social Epidemiology
3 - HLTH 498 Improving Population Health
3 - Concentration Area Requirement[3]
3 - Cultural and Family Context Requirement[6]
4 - Elective
16

Second Semester
3 - HLTH 440 Managing Health Service Org.
3 - Concentration Area Requirement[3]
3 - Humanities Requirement E.1[1]
6 - Elective
15

133-135 Total Semester Hours

[1]See General Education Requirements.

[2]See advisor.

[3]CH 223/224 required for Pre-Med and Pre-Dental students. BIOCH 301 is strongly recommended for Pre-Med students. See advisor for a list of recommended theme courses.

[4]Select from EX ST 301, MTHSC 203, 301.

[5]Internship must be completed in one or two semesters. Internship may be done fall, spring, and summer after completing HLTH 419. Prior approval is required for summer internships. 2.0 grade-point ratio required for registration.

[6]Select from ANTH 201, 301, 351, GEOG 103, 330, 340, 360, SOC 201, 311, 460, 480.

Note: Students must receive a minimum grade of C in all HLTH courses. Health courses may be repeated only once.

NURSING

Bachelor of Science

The Bachelor of Science degree program with a major in Nursing prepares students for professional nursing practice in a variety of settings, such as hospitals, industry, clinics, and public health agencies. During the first two years, emphasis is on liberal arts and basic science courses arranged to provide a foundation for the nursing major. Junior and senior courses emphasize the study of nursing. Clinical nursing experiences, guided by the Nursing faculty, involve acute and community-based settings. Students are responsible for their own transportation to all off-campus clinical laboratory experiences, which may extend throughout the Upstate.

Entrance Requirements

To facilitate admission of students who can achieve at an appropriate level in the program, admission is selective. Consideration is given to performance in secondary school and on the College Board Examination (SAT). Those seeking admission are advised to apply to the University early in the fall of the senior year in high school.

When space is available, a student may change majors into the School of Nursing with a 2.5 cumulative grade-point average.

Each Nursing major is required to carry, throughout the clinical laboratory period, a current and valid student nurse's professional liability insurance policy with minimum limits of liability of $1,000,000 per occurence and $3,000,000 in aggregate. Documentation of such coverage must be provided to the Director of the School of Nursing. No student may participate in clinical learning activities without this insurance coverage.

To comply with clinical agency contract requirements and South Carolina law, students enrolled in nursing courses with a clinical laboratory must meet specific requirements listed in the *School of Nursing Student Handbook*.

The School of Nursing programs are accredited by the National League for Nursing Accrediting Commission, 350 Hudson St., New York, NY 10014; telephone (212) 989-9393, extension 451/153.

Freshman Year

First Semester
4 - BIOL 103 General Biology I
4 - CH 101 General Chemistry I
3 - ENGL 101 Composition I
3 - PSYCH 201 Introduction to Psychology
3 - SOC 201 Introduction to Sociology
17

Second Semester
4 - CH 102 General Chemistry II
3 - ENGL 102 Composition II
3 - MTHSC 101 Introduction to Probability
3 - NUTR 203 Principles of Human Nutrition
3 - Computer Skills Requirement[1]
16

Sophomore Year

First Semester
4 - BIOSC 222 Human Anatomy and Phys. I
3 - EX ST 301 Introductory Statistics *or*
3 - MTHSC 203 Elem. Statistical Inference
4 - MICRO 205 Introductory Microbiology
3 - Humanities Requirement E.1[1]
3 - Elective
17

Second Semester
4 - BIOSC 223 Human Anatomy and Phys. II
3 - Humanities Requirement E.2[1]
7 - Elective
14

Junior Year

First Semester
3 - NURS 304 Pathophys. for Health-Care Prof.
3 - NURS 310 Health Assessment
4 - NURS 312 Therapeutic Nursing Interventions
2 - NURS 320 Professionalism in Nursing
3 - NURS 340 Pharmacother. Nurs. Interventions
15

Second Semester
7 - NURS 303 Nursing of Adults
3 - NURS 305 Psychosocial Nursing
2 - NURS 311 Intro. to Community Nursing
2 - NURS 323 Gerontology Nursing
3 - NURS 330 Research in Nursing
17

Senior Year

First Semester
5 - NURS 401 Mental Health Nursing
5 - NURS 411 Nursing Care of Children
5 - NURS 412 Nurs. Care of Women and Families
3 - Oral Communication Requirement[1]
18

Second Semester
5 - NURS 403 Complex Nursing of Adults
3 - NURS 405 Leadership and Mgt. in Nursing
3 - NURS 408 Senior Nursing Practicum
4 - NURS 415 Community Health Nursing
15

129 Total Semester Hours

[1]See General Education Requirements.

Notes:
1. A minimum grade of C is required in all science courses for progression to junior year nursing courses.
2. A minimum grade of C must be achieved in all required nursing courses for progression to the next level. Students may repeat a nursing course one time only.
3. Students must pass didactic and clinical component to pass all clinical courses.
4. A minimum grade-point ratio of 2.0 is required for registration in each nursing course.

Registered Nurse BS Completion Program

The RN/BS curriculum offers an individualized study option for the registered nurse to obtain a baccalaureate degree in Nursing. Credits may be earned through an accelerated program of study, combining transfer credits for selected courses from accredited institutions of higher learning, credit by examination for previously completed nursing courses, and enrollment in courses at Clemson University. Qualified students may take up to six graduate courses towards the master's degree in nursing. Registered nurses interested in pursuing a baccalaureate degree should contact the School of Nursing for curriculum requirements.

Freshman Year[1]

First Semester
3 - ENGL 101 Composition I
3 - PSYCH 201 Introduction to Psychology
3 - Computer Skills Requirement[2]
8 - Science Requirement[3]
17

Second Semester
3 - ENGL 102 Composition II
4 - MICRO 205 Introductory Microbiology
3 - NUTR 203 Principles of Human Nutrition
3 - SOC 201 Introduction to Sociology
4 - Science Requirement[3]
17

Sophomore Year[1]

First Semester
4 - BIOSC 222 Human Anatomy and Phys. I
3 - MTHSC 101 Introduction to Probability
6 - Humanities Requirement E.1 and E.2[2]
3 - Elective
16

Second Semester
4 - BIOSC 223 Human Anatomy and Phys. II
3 - EX ST 301 Introductory Statistics *or*
3 - MTHSC 203 Elem. Statistical Inference
3 - Oral Communication Requirement[2]
4 - Elective
14

Junior Year

First Semester
7 - NURS 303 Nursing of Adults[4]
4 - NURS 312 Therapeutic Nurs. Interventions[4]
5 - NURS 401 Mental Health Nursing[4]
5 - NURS 411 Nursing Care of Children[4]
21

Second Semester
3 - NURS 304 Pathophys. for Health-Care Prof.
5 - NURS 307 Family Nursing in the Community
4 - NURS 313 Health Assess. Through Lifespan
3 - NURS 330 Research in Nursing
15

Senior Year

First Semester
5 - NURS 403 Complex Nursing of Adults[4]
3 - NURS 406 Issues in Professionalism
5 - NURS 412 Nursing Care of Women and Fam.[4]
13

Second Semester
3 - NURS 405 Leadership and Mgt. in Nursing
4 - NURS 415 Community Health Nursing
6 - Departmental Requirement[5]
3 - Elective
16

129 Total Semester Hours

[1]Students are expected to transfer all courses listed in the freshman and sophomore years.

[2]See General Education Requirements.

[3]Twelve hours selected from BIOL 103, 104; CH 101, 102. Biology and chemistry must be represented; two of the courses must be in a sequence.

[4]Students are expected to receive credit by examination.

[5]See advisor.

Notes:

1. All courses used to fulfill the support course requirements must be approved by the School of Nursing.
2. A minimum grade of C must be achieved in all nursing courses for progression to the next level. Students may repeat a nursing course one time only.
3. Seniors must have a cumulative grade-point ratio of 3.0 or higher on all college courses attempted to be eligible to enroll in courses numbered 800 or above (subject to approval of form GS6). See advisor for details.
4. To qualify for an undergraduate degree, a student must complete 37 of the last 43 credits at Clemson.

PARKS, RECREATION, AND TOURISM MANAGEMENT

Bachelor of Science

The curriculum in Parks, Recreation, and Tourism Management prepares students for a variety of careers in public and private leisure services. The undergraduate curriculum provides broad exposure to the social, physical, and biological sciences required to manage leisure service programs and resources, such as those for municipalities, institutions, voluntary and youth-serving agencies, management positions within the travel and tourism industry, and as resource managers of local, state, and federal parks and related lands and waters.

The flexible curriculum allows students to select from six concentrations: Community Leisure Services, Professional Golf Management, Recreation Resources Management, Sport Management, Therapeutic Recreation, and Travel and Tourism. The concentration in Professional Golf Management is limited to 30 students each academic year, and there are additional requirements for acceptance into this concentration. This latitude permits accommodation of each student's career objectives in positions in fitness center management, sport management, recreation, cultural arts management, commercial recreation, wilderness management, nature interpretation, park management, historic site management, rehabilitation services, leisure counseling, camp administration, recreation therapy, programs for people with disabilities or senior citizens, travel industry, resort management, convention and visitor bureaus, theme parks, community tourism, and special event/festival planning, to name a few.

The Parks, Recreation, and Tourism Management program is accredited by the National Council on Accreditation (National Recreation and Park Association/Council for Higher Education Accreditation). A graduate is immediately eligible to apply to become a "Certified Park and Recreation Professional," a valuable credential for professional advancement.

Graduate degrees offered are Master of Parks, Recreation, and Tourism Management; Master of Science; and Doctor of Philosophy.

The Department of Parks, Recreation, and Tourism Management is a South Carolina Commission on Higher Education "Commendation for Excellence" recipient and a top-ranked program nationally.

Students will find it beneficial to have a personal computer meeting or exceeding current technology standards.

Freshman Year

First Semester
4 - BIOL 103 General Biology I[1] *or*
3 - GEOL 101 Physical Geology[1] *and*
1 - GEOL 103 Physical Geology Lab.[1]
3 - ENGL 101 Composition I
3 - PRTM 101 Concepts of Leisure
3 - PRTM 209 Professional Application of Microcomputers[2]
3 - Mathematical Sciences Requirement[3]
16

Second Semester
4 - BIOL 104 General Biology II[1] *or*
4 - Geology Laboratory Science[1]
3 - ENGL 102 Composition II
3 - PRTM 205 Program and Event Planning
3 - Mathematical Sciences Requirement[3]
3 - Elective
16

Sophomore Year

First Semester
3 - PRTM 201 The Recreation/Leisure Environ.
1 - PRTM 206 Practicum I
3 - PSYCH 201 Introduction to Psychology[4] *or*
3 - SOC 201 Introduction to Sociology[4]
3 - Concentration[5]
3 - Humanities Requirement E.2[6]
3 - Literature Requirement[7]
16

Second Semester
1 - PRTM 207 Practicum II
3 - PRTM 308 Leadership and Group Proc. in Rec.
3 - SPCH 250 Public Speaking
6 - Concentration[5]
3 - Social Science Requirement[8]
16

Junior Year

First Semester
3 - PRTM 321 Recreation Administration
1 - PRTM 404 Field Training I
9 - Concentration[5]
3 - Writing Intensive Requirement[3]
16

Second Semester
3 - PRTM 305 Safety and Risk Management
3 - PRTM 309 Behavioral Concepts
7-8 - Concentration[5]
4-3 - Elective
17

Summer

6 - PRTM 405 Field Training II

Senior Year

First Semester
3 - PRTM 409 Methods of Recreation Research I
10 - Concentration[5]
3 - Elective
16

Second Semester
1 - PRTM 406 Senior Seminar
3 - PRTM 410 Methods of Recreation Research II
9 - Concentration[5]
3 - Elective
16

135 Total Semester Hours

[1]Eight-hour sequence in the same science. Therapeutic Recreation and Sport Management students must take the general biology sequence.

[2]Other General Education Computer Skills courses may be substituted.

[3]See General Education Requirements.

[4]Therapeutic Recreation students must take both courses.

[5]See advisor. Actual credits may vary depending on the courses selected. There is some variation in the distribution of hours among the concentrations.

[6]Sport Management students must take PHIL 103 or 344. All others see General Education Requirements.

[7]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[8]Sport Management students must take ECON 200 (preferred), 211, or 212. Therapeutic Recreation students see footnote 4. All others see General Education Requirements.

Note: Students select from six concentrations: Community Leisure Services, Professional Golf Management, Recreation Resources Management, Sport Management, Therapeutic Recreation, or Travel and Tourism. Students may focus in the area of Sport Management by selecting from Commercial Sport Management, Institutional Sport Management, Sports Communication Management, Sports Health and Fitness Management, or Sport Marketing.

PROFESSIONAL GOLF MANAGEMENT CONCENTRATION

Freshman Year

First Semester

4 - BIOL 103 General Biology I
3 - ENGL 101 Composition I
3 - PRTM 101 Concepts of Leisure
3 - PRTM 209 Prof. Appl. of Microcomputers[1]
3 - Mathematical Sciences Requirement[2]
16

Second Semester

4 - BIOL 104 General Biology II
3 - ENGL 102 Composition II
3 - PRTM 205 Program and Event Planning
3 - Mathematical Sciences Requirement[2]
3 - Elective
16

Summer

0 - CO-OP 101 Cooperative Education
1 - PRTM 206 Practicum I
1

Sophomore Year

First Semester

3 - ACCT 201 Financial Accounting Concepts
3 - PRTM 201 Recreation/Leisure Environment
3 - PRTM 307 Facility Operations and Main.
3 - PSYCH 201 Introduction to Psychology *or*
    3 - SOC 201 Intro. to Sociology
3 - Literature Requirement[3]
15

Second Semester

3 - ECON 200 Economic Concepts[4]
3 - MGT 301 Principles of Management
3 - PHIL 103 Introduction to Ethics *or*
    3 - PHIL 344 Business Ethics
3 - PRTM 308 Leadership and Group Proc. in Rec.
3 - SPCH 250 Public Speaking
15

Summer

0 - CO-OP 102 Cooperative Education
1 - PRTM 207 Practicum II
1

Junior Year

First Semester

3 - ACCT 202 Managerial Accounting Concepts
3 - LAW 322 Legal Environment of Business
3 - MKT 301 Principles of Marketing
3 - PRTM 321 Recreation Administration
1 - PRTM 404 Field Training I
3 - Writing Intensive Requirement[5]
16

Second Semester

4 - HORT 308 Landscape Design
3 - MGT 307 Personnel Management
3 - PRTM 305 Safety and Risk Mgt. in PRTM
3 - PRTM 309 Behavioral Concepts in PRTM
3 - Elective
16

Summer

0 - CO-OP 103 Cooperative Education
6 - PRTM 405 Field Training II
6

Senior Year

First Semester

3 - FD SC 306 Food Service Operations
3 - FIN 306 Corporation Finance
3 - PRTM 409 Methods of Recreation Research I
3 - PRTM 441 Commercial Recreation
3 - Elective
15

Second Semester

3 - HORT 412 Turfgrass Management
3 - MKT 425 Retail Management
3 - PRTM 344 Tourism Markets and Supply
1 - PRTM 406 Senior Seminar
3 - PRTM 410 Methods of Recreation Research II
3 - Elective
16

Summer and Fall

0 - CO-OP 104 Cooperative Education
3 - PRTM 483 Golf Club Mgt. and Operations
3

136 Total Semester Hours

[1]Other General Education Computer Skills courses may be substituted.

[2]See General Education Requirements. MTHSC 101 and 203 are recommended.

[3]ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

[4]ECON 200 is preferred. ECON 211 or 212 may be substituted.

[5]See General Education Requirements.

MINORS

Following are minors acceptable for students in the College of Health, Education, and Human Development. Students cannot major and minor in the same field or acquire a minor that is not allowed by the degree program.

Accounting
Adult/Extension Education
Aerospace Studies
African American Studies
Agricultural Business Management
Agricultural Mechanization and Business
Anthropology
Aquaculture, Fisheries, and Wildlife Biology
Beef Cattle Production
Biochemistry
Bioengineering
Biological Sciences—*not open to Science Teaching–Biological Sciences majors*
Business Administration
Chemistry
Cluster
Communications
Computer Science
Crop and Soil Environmental Science
Early Intervention Specialist—*open to Early Childhood Education, Health Science, and Special Education majors only*
Economics—*not open to Secondary Education–Political Science and Economics majors*
Elementary Education—*open to Health Science, Nursing, and Parks, Recreation, and Tourism majors only*
English
Entomology
Entrepreneurship
Environmental Engineering
Environmental Science and Policy
Film Studies
Financial Management
Fine Arts
Food Science
Forest Products
Forest Resource Management
Geography—*not open to Secondary Education–History and Geography majors*
Geology
Great Works
Health Science
History—*not open to Secondary Education–History and Geography majors*
Horse Production
Horticulture
Human Resource Management
International Politics
Legal Studies
Management
Marketing
Mathematical Sciences—*not open to Mathematics Teaching or Secondary Education–Mathematics majors*
Microbiology
Military Science
Modern Languages—*not open to Secondary Education–Modern Languages majors*
Music
Natural Resource Economics
Operations Management
Packaging Science
Parks, Recreation, and Tourism Management
Philosophy
Physics—*not open to Science Teaching–Physical Sciences majors*
Plant Pathology
Political Science—*not open to Secondary Education–Political Science and Economics majors*
Poultry Science
Psychology—*not open to Secondary Education–Psychology and Sociology majors*
Public Policy
Religion
Science and Technology in Society
Screenwriting
Secondary Education—*open to Health Science, Nursing, and Parks, Recreation, and Tourism Management majors only*
Sociology
Spanish-American Area Studies
Speech and Communication Studies
Textiles
Theatre
Urban Forestry
Women's Studies
Writing

See pages 30-33 for details.

COURSES OF INSTRUCTION

This list of courses includes for each course the catalog number, title, credit hours, class laboratory hours per week, and the description. Courses numbered 600 and above are graduate courses. Computer skills, oral communication, and writing intensive equivalencies are noted in brackets (e.g., [W.3]). Where courses are offered on a schedule, there is a designation F, S, M, or SS following the title, indicating whether the course is offered in the fall, spring, Maymester, or summer school.

ACCOUNTING

Professors: E. L. Bryan, L. S. Cash, T. L. Dickens, R. K. Doost, G. T. Friedlob, R. E. Welton, Jr., *Director;* A. J. Winters; *Associate Professors:* L. S. Clark, J. J. McMillan, L. F. Schleifer; *Assistant Professor:* D. M. Guffey; *Lecturers:* M. L. Fowler, J. R. Madray, M. A. Prater; *Visiting Assistant Professor:* J. D. Mason; *Visiting Lecturer:* R. G. Littleson

ACCT 200 Basic Accounting 3(3,0) General survey of accounting for students requiring only a basic knowledge of principles and concepts. May not be taken by students in curricula requiring ACCT 201.

ACCT 201, H201 Financial Accounting Concepts 3(3,0) Introduction to accounting principles with emphasis on the use of financial data and analysis of financial statements.

ACCT 202, H202 Managerial Accounting Concepts 3(3,0) Introduction to managerial accounting with emphasis on using accounting information to make decisions. *Preq:* ACCT 201.

ACCT 204 Accounting Procedures 1(1,2) Lectures, demonstrations, and hands-on experience with accounting systems and analysis required to complete the accounting cycle and prepare financial statements. Intended for students who will enroll in ACCT 301.

ACCT 301, H301 Intermediate Accounting I 3(3,0) In-depth treatment of the traditional financial accounting topics of current and noncurrent assets and liabilities. Emphasis is placed on basic theory, valuation, and measurement as well as presentation and analysis. *Preq:* ACCT 201, 204.

ACCT 302, H302 Intermediate Accounting II 3(3,0) Continuation of ACCT 301. In-depth treatment of equity, cash flows, and selected accounting topics such as tax allocation, post-employment benefits, and leases. Emphasis is placed on basic theory, valuation, and measurement as well as presentation and analysis. *Preq:* ACCT 301.

ACCT 303, H303 Cost Accounting 3(3,0) Application of cost analysis to manufacturing and distributing problems; analysis of behavior characteristics of business costs and a study of principles involved in standard cost systems; lectures and problems. *Preq:* A grade of C or better in ACCT 201 and 204.

ACCT 307, H307 Managerial Accounting 3(3,0) Emphasizes internal use of accounting data by the manager in establishing plans and objectives, controlling operations, and making decisions involved with management of an enterprise. Cannot be taken for credit by Accounting majors. *Preq:* ACCT 202.

ACCT 311 Intermediate Financial Accounting I 3(3,0) In-depth treatment of traditional financial accounting topics of standards setting, financial statement form and content, and accounting and reporting of current assets. Emphasis is placed on basic theory, valuation, and measurement, as well as presentation and analysis of accounting information. *Preq:* A grade of C or better in ACCT 201 and 204.

ACCT 312 Intermediate Financial Accounting II 3(3,0) Continuation of ACCT 311. In-depth treatment of accounting and reporting for noncurrent assets, current and noncurrent liabilities, and equity. Emphasis is placed on basic theory, valuation, and measurement issues, as well as presentation and analysis of accounting information. *Preq:* A grade of C or better in ACCT 311.

ACCT 313 Intermediate Financial Accounting III 3(3,0) Continuation of ACCT 312. In-depth treatment of selected accounting topics, such as investments, cash flows, tax allocation, post-retirement benefits, leases, and error corrections. Emphasis is placed on basic theory, valuation, and measurement, as well as presentation and analysis of accounting information. *Preq:* A grade of C or better in ACCT 312.

ACCT 322 Accounting Information Systems 3(3,0) Study of computer-based accounting systems with attention to systems design, application, internal control, auditing the system, and system security. *Preq:* CP SC 220.

ACCT 340 Internal Auditing Theory 3(3,0) Introduces students to internal auditing and covers internal auditing standards, ethics, concepts, audit techniques, and reporting practices. Enrollment priority will be given to students who have completed 60, but not more than 100, credits. *Preq:* A grade of C or better in ACCT 301 or consent of instructor.

ACCT 399 Internship in Accounting 1-3(0,3-9) Preplanned, preapproved, faculty-supervised accounting internships designed to give students on-the-job learning opportunities that will support their classroom experiences. Credit will not be given for internships of less than six, full-time, consecutive weeks with the same internship provider. May be repeated for a maximum of three credits. To be taken Pass/Fail only. *Preq:* Junior standing and consent of instructor.

ACCT 404, H404, 604 Individual Taxation 3(3,0) Interpretation of Federal income tax laws, regulations, and court decisions with practice in application of these laws to the returns of individuals, partnerships, and corporations. *Preq:* A grade of C or better in ACCT 301.

ACCT 406 Business Taxation 3(3,0) Provides an introduction to the importance of taxation in business decision making; emphasizes the interrelationship of taxes, the choice of business form, and various business transactions; exposes students to the breadth of business decisions which are affected by the Federal Income Tax. *Preq:* A grade of C or better in ACCT 301.

ACCT 408 Retirement and Estate Planning 3(3,0) Provides students with an understanding of the tax consequences of personal financial, retirement, and estate planning. Subjects covered include the basic concepts of retirement, gift, income shifting, and estate planning. *Preq:* A grade of C or better in ACCT 404.

ACCT 410 Budgeting and Executive Control 3(3,0) Study and application of selected techniques used in the planning and control functions of business organizations. *Preq:* A grade of C or better in ACCT 303.

ACCT 415 Auditing 3(3,0) Professional and practical auditing theory. Review of internal controls, audit procedures, and development of audit programs for various types of businesses; consideration of auditor's professional and ethical standards. *Preq:* A grade of C or better in ACCT 301 and 322.

ACCT 445 Internal Auditing Practice 3(3,0) Expands the students' knowledge of internal auditing practice, including operation audits, organization audits, quality-control audits, and organization theory. *Preq:* A grade of C or better in ACCT 340.

AEROSPACE STUDIES

Professor: S. Edge, *Chair; Assistant Professors:* W. E. Iseman, A. H. Palmer, R. K. Stroud

A S 109 Air Force Today I 1(1,1) Deals with Air Force in the contemporary world through a study of the total force structure: strategic offensive and defensive, general purpose, and aerospace support. Leadership laboratory activities include drill fundamentals, customs, and courtesies of the service.

A S 110 Air Force Today II 1(1,1) Continuation of A S 109. Leadership laboratory includes drill, ceremonies, and an introduction to Air Force career opportunities.

A S 209 Development of Air Power I 1(1,0) Includes the study of the development of air power from balloons and dirigibles through the peaceful employment of U.S. air power in relief missions and civic action programs in the late 1960s and also the air war in Southeast Asia. Leadership laboratory provides experience in guiding, directing, and controlling an Air Force unit.

A S 210 Development of Air Power II 1(1,1) Continuation of A S 209.

A S 309 Air Force Leadership and Management I 3(3,1) Emphasizes the individual as a manager. Individual motivational and behavioral processes, leadership, communication, and group dynamics are covered to provide a foundation for the development of the Air Force officer's professional skills. Students prepare individual and group presentations, write reports, participate in group discussions, seminars, and conferences.

A S 310 Air Force Leadership and Management II 3(3,1) Continuation of A S 309. Uses the basic managerial processes involving decision making, utilization of analytical aids in planning, organizing, and controlling environment. Actual case studies are used to enhance learning and communication processes.

A S 409 National Security Policy I 3(3,1) Analysis of the role and function of the military officer in a democratic society and the relationships involved in civil-military interactions. Students prepare individual and group presentations, write reports, and participate in group discussions.

A S 410 National Security Policy II 3(3,1) Continuation of A S 409. Examines the environmental context in which U.S. defense policy is formulated and implemented. Emphasis is placed on initial commissioned service and military justice. Students prepare individual and group presentations for the class, write reports, and participate in group discussions, seminars, and conferences.

AFRICAN AMERICAN STUDIES

Professor: H. L. Suggs

A A S 301 Introduction to African American Studies 3(3,0) Study of African American experience from an Afrocentric perspective from colonial America to the present.

A A S 498 Seminar on African American Studies 3(3,0) Research/writing seminar on the African American experience. Selected topics and themes from 1900 to present. *Preq:* A A S 301, HIST 311, 312 or 339.

AGRICULTURAL AND APPLIED ECONOMICS

Professors: D. L. Barkley, L. L. Bauer, G. L. Bradford, M. D. Hammig, *Chair;* M. S. Henry, K. H. Kahl, E. L. McLean, S. E. Miller, G. J. Wells; *Associate Professors:* E. H. Kaiser, W. M. Smathers, Jr.; *Assistant Professors:* M. Espey

AP EC 202 Agricultural Economics 3(3,0) Analytical survey of the various subdivisions of agricultural economics, including farm organization, enterprise, land economics, marketing, farm prices, governmental farm policies, and the relation of agriculture to the national and international economy.

AP EC 257 Natural Resources, Environment, and Economics 3(3,0)F Economic principles applied to resource allocation problems related to environmental and natural resource issues.

AP EC 302 Economics of Farm Management 3(2,3)F Economic principles underlying the organization and operation of agricultural firms and related business enterprises. Particular emphasis is directed to management aspects of the farm as a production unit. *Preq:* AP EC 202 or ECON 211.

AP EC 308 Quantitative Applied Economics 3(3,0)S Basic quantitative relationships in applied economics are examined and interpreted. Emphasis is placed on the mathematical aspects of applied economics. Microcomputer software is utilized for problem solving.

AP EC 309, H309 Economics of Agricultural Marketing 3(3,0)F General course in marketing agricultural commodities with particular emphasis upon food products. Efficiency criteria, consumer behavior, market organizations and institutions, and marketing functions are analyzed. *Preq:* AP EC 202.

AP EC 313 Principles of Real Estate Appraisal 3(3,0)F,S Introduction to basic principles and procedures of real estate appraisal. Topics include the real estate market, principles of valuation, legal concepts, and the application of the comparable sales, cost, and income approaches to real estate valuation. *Preq:* FIN 307 or consent of instructor.

AP EC 319 Agribusiness Management 3(3,0)F Study of the principles used in making management decisions and the application of these principles in agribusiness. Emphasis is given to the application of economics to the solution of problems facing managers of agricultural supply and marketing firms. *Preq:* AP EC 302 or 309.

AP EC 351 Principles of Advertising 3(3,0)S Introduction to the various functions of advertising; research and audience analysis; various media formats; planning, research, and production necessary to create an advertising campaign; social effects, economic effects, and ethical considerations of advertising.

AP EC 352 Public Finance 3(3,0)S Principles of financing government, sources of public revenue, objects of public expenditures, problems of fiscal administration, and the application of fiscal policies in stabilizing the national economy. *Preq:* Junior standing.

AP EC (C R D, HLTH) 361 Introduction to Health-Care Economics 3(3,0) See C R D 361.

AP EC 402, 602 Production Economics 3(3,0)F Economic analysis of agricultural production involving the concept of the farm as a firm; principles for decision making; the quantitative nature and use of production and cost functions and the interrelations and applications of these principles to resource allocation in farms and among areas. *Preq:* AP EC 308, ECON 314.

AP EC 403, 603 Land Economics 3(3,0)S Study of the characteristics of land and of the physical, legal, social, and economic principles and problems relating to the control and use of land resources. *Preq:* AP EC 202 or ECON 200.

AP EC 409, 609 Commodity Futures Markets 3(3,0) Introduction to the economic theory, organization, and operating principles of agricultural commodity futures markets in the United States. Emphasis is placed on speculating, hedging, and investing in agricultural commodity futures contracts from the standpoint of the agribusiness entrepreneur. *Preq:* AP EC 202 or ECON 211.

AP EC (C R D) 411, 611 Regional Impact Analysis 3(3,0) See C R D 411.

AP EC (C R D) 412, 612 Spatial Competition and Rural Development 3(3,0) See C R D 412.

AP EC 413, 613 Advanced Real Estate Appraisal 3(3,0)S Topics include highest and best use analysis, data collection, and analyses. Advanced appraisal procedures for income, cost, and comparable sales approach to real estate valuation are stressed. Eminent domain, the appraisal of property in transition, and specialized property are covered. *Preq:* AP EC 313, FIN 307, or consent of instructor.

AP EC 420, 620 World Agricultural Trade 3(3,0)S Practical considerations of agricultural trade and trade policy analysis are reviewed. The role of international institutions is considered. Special emphasis is placed on concepts of agricultural trade, analysis of trade policies of major trading partners/competitors, and export/import marketing of products. *Preq:* AP EC 309, ECON 412, or consent of instructor.

AP EC (CSENV) 426, 626 Cropping Systems Analysis 3(2,2)F See CSENV 426.

AP EC 433, 633 Agricultural Law and Related Environmental Issues 3(3,0)S Introduction to agricultural and agricultural-related environmental legal issues. Topics include a review of laws, agencies, programs, court structure, torts, taxation, biotechnology, land and water use, regulated industry and environment liabilities as they relate to agriculture and natural resources. *Preq:* LAW 322 or consent of instructor.

AP EC 452, H452, 652 Agricultural Policy 3(3,0)F Review of public agricultural policy programs in the United States and a critical examination of current and proposed government policies and programs affecting the agricultural sector of the economy. Economic considerations as related to past and current farm price and income problems are included. *Preq:* AP EC 302, 309.

AP EC 456, H456, 656 Prices 3(3,0)S Review of the basic theory of price under competitive conditions and various modifications; nature, measurement, and causes of daily, seasonal, and cyclical price fluctuations; geographical price relationships; nature, function, and behavior of futures markets; government price programs. *Preq:* AP EC 308, ECON 314, EX ST 462.

AP EC 460, 660 Agricultural Finance 3(3,0)S Study of the principles and technique of financing in the agricultural sector. Topics include the capital situation in agriculture, concepts of farm financial management, use of credit, capital markets, lending agencies, and estate planning. *Preq:* ACCT 200 or 201, AP EC 202.

AP EC 475, 675 Economics of Wildlife Management and Policy 3(3,0) Integrated approach to the study of the economics of wildlife. Topics include determination of market and nonmarket value, single and multiple species management, enterprise cost and returns, marketing wildlife, leasing methods, complementarity and competitiveness with agricultural and forestry enterprises, and timber and crop damage cost estimates and control. *Preq:* AP EC 202, ECON 200, FOR 304, W F B 306, or consent of instructor.

AP EC 490 Selected Topics 1-15(0,2-30) Study of topics in applied economics. Topics may include classroom and/or field experience not normally covered in other classes. May be repeated for credit, but only if different topics are covered. *Preq:* Junior standing and/or consent of instructor.

AP EC (C R D) 491 Internship, Agribusiness, and Community and Rural Development 1-6(0,2-12) See C R D 491.

AGRICULTURAL EDUCATION

Associate Professor: C. D. White, Sr.

AG ED 100 Orientation and Field Experience 1(0,2)S Supervised observations and explanations of vocational agriculture teaching while serving as teacher aides. One full week of field experience in representative high schools is required.

AG ED 201 Introduction to Agricultural Education 3(2,3)F Principles of education, development of agricultural education, and an introduction to the formulation of instructional programs for the teaching of agricultural courses.

AG ED 400 Supervised Field Experience II 1(0,3)F Special emphasis is placed on enhancing existing knowledge and experiences of the students. Primary focus is on becoming acquainted with the student teaching center well in advance of the customary twelve-week directed teaching experience.

AG ED 401, 601 Methods in Agricultural Education 3(2,3)S Appropriate methods of teaching vocational agriculture in high schools. Includes procedures for organizing teaching programs, teaching high school students, and directing FFA activities.

AG ED 403, 603 Principles of Adult/Extension Education 3(3,0) Overview of adult/extension education and adult learning. Selection of adult education providers is reviewed with emphasis on extension. *Preq:* Junior standing or consent of instructor.

AG ED 406 Directed Teaching 12(0,36)S Guided participation in the professional responsibilities of a teacher of vocational agriculture including intensive study of the problems encountered and competencies developed. Twelve weeks of directed teaching in selected schools are required. *Preq:* AG ED 400, 401.

AG ED 407 Internship in Extension Education 6(0,18)S Internship placements may include county extension offices and other appropriate extension units. Six weeks of supervised experience must be completed for six hours of credit. Twelve weeks of supervised experience must be completed for 12 hours of credit. May be repeated for a maximum of 12 credits. *Preq:* AG ED 400, Senior standing, and consent of instructor.

AG ED 423, 623 Curriculum 2(2,0)S Curriculum goals and related planning for career and continuing education programs.

AG ED 425, 625 Teaching Agricultural Mechanics 2(1,3)S Organizing course content, conducting and managing an agricultural mechanics laboratory, shop safety, microteaching demonstrations of psychomotor skills, and methods of teaching manipulative abilities.

AG ED 428, 628 Special Studies in Agricultural Education 1-3(1-3,0) Students study, individually or collectively, selected topics and/or problems in agricultural education to meet the particular needs of the clientele enrolled. May be repeated for a maximum of six credits.

AG ED 431, 631 Methods in Environmental Education 3(3,0)SS Study of various techniques appropriate for teaching environmental education. Instruction is applicable to elementary, high school, and adult-level teachers. Summer school only.

AG ED 440, 640 Program Development in Adult/Extension Education 3(3,0) Principles, theory, and practice in planning and conducting educational programs in adult/extension settings. *Preq:* Junior standing or consent of instructor.

AG ED 445, 645 Evaluation of Adult/Extension Education Programs 3(3,0) Philosophy and methodology of evaluating adult educational programs such as extension or adult continuing education programs. Emphasis is on designing and conducting different types of program evaluations, including appropriate data collection methods. *Preq:* Junior standing or consent of instructor.

AG ED 450, 650 Modern Topics and Issues 3(3,0) A major area of concern to teachers of agriculture and county agents is selected for intensive study at least one semester prior to offering the course. Team teaching with faculty from other departments in the College of Agriculture, Forestry, and Life Sciences is utilized when feasible. *Preq:* Senior standing or relevant experience.

AG ED (ED F, THRD) 480, 680 Educational Applications of Microcomputers 3(2,2) [C.3] See ED F 480.

AG ED (ED F, THRD) 482, 682 Advanced Educational Applications of Microcomputers 3(2,2) See ED F 482.

AGRICULTURAL MECHANIZATION

Professors: W. H. Allen, D. E. Brune, J. A. Collier, R. B. Dodd, Y. J. Han, J. C. Hayes, *Chair*; D. E. Linvill, R. E. Williamson; *Assistant Professors:* T. O. Owino, M. A. Schlautman; *Instructor:* T. R. Garrett

AG M 101 Introduction to Agricultural Mechanization and Business 1(0,3) Introduction to Agricultural Mechanization and Business program. An overview of the curriculum is given and the opportunities for extracurricular activities explained. Long-term interaction between the department and alumni is covered.

AG M 205 Principles of Farm Shop 3(2,3) Principles, techniques, and methods in the selection, proper use, and maintenance of hand and power tools. Principal topics include welding, tool fitting, metalworking, woodworking, finishing and preserving, and heat treatment.

AG M 206 Agricultural Mechanization 3(2,3) Agriculture students are taught to apply physical principles and sound reasoning to the mechanization of modern agricultural production and processing enterprises. Planning efficient operational systems and wise selection of equipment, based on function and economic suitability are stressed. *Preq:* MTHSC 105, PHYS 207 or consent of instructor.

AG M 301 Soil and Water Conservation 3(2,3) Water management in agriculture is studied by applying principles of elementary surveying, mathematics, and fluid flow as related to soil-water-vegetation complexes in erosion control, water conservation, drainage, and irrigation.

AG M 303 Calculations for Mechanized Agriculture 3(2,3) Enhances students' ability to analyze and solve a wide range of problems requiring engineering technology. Laboratory periods introduce students to microcomputer hardware. Basic programming and typical applications to agricultural mechanization problems are included. *Preq:* PHYS 207 or consent of instructor.

AG M 401, 601 Environmental Control for Plants and Animals 1(1,0) Basic concepts of environmental control for plant and animal production and human housing are presented. Elements include heat transfer, psychrometry, heating, cooling, ventilation, and heat/moisture balances. *Preq:* PHYS 200 or consent of instructor.

AG M 402, 602 Drainage, Irrigation, and Waste Management 3(2,3) Basic soil-water-plant relationships are used to determine the need for and methods of irrigation, drainage, and waste management. Topics include irrigation methods, drainage needs, drainage methods, and waste-treatment methods.

AG M 403, 603 Structures for Plants and Animals 2(1,3) Structures for agricultural production systems are planned and designed with regard to function, materials, loads and component sizing, utilizing the approach of an engineering or construction technologist. *Preq:* PHYS 200 or consent of instructor.

AG M 406, 606 Mechanical and Hydraulic Systems 3(2,3) Study of power transmission systems for agricultural production with emphasis on mobile equipment. Characteristics, requirements, and design of both V-belt drive and roller-chain drives are presented. Emphasis is on hydraulic power transmission systems, including pumps, actuators, control devices, and hydraulic circuitry. *Preq:* AG M 206, PHYS 207 or consent of instructor.

AG M 408 Equipment Sales and Service 3(3,0) Agricultural equipment sales and service techniques, inventory, and accounting procedures followed by the farm machinery industry.

AG M 452, 652 Farm Power 3(2,3) Study of tractors with emphasis on internal combustion engines and support systems necessary for their proper functioning. Application of power, maintenance, adjustment, and general repair are also considered. *Preq:* PHYS 207 or consent of instructor.

AG M 460, 660 Farm and Home Utilities 3(2,3) Students in agriculture and related curricula study electric and other utilities on the farm and in the home. Selection, installation, and maintenance of wiring systems, lighting systems, motors, controls, water systems, and waste disposal systems are emphasized. *Preq:* PHYS 208 or consent of instructor, Junior standing.

AG M 472 Seminar 1(1,0) Introduction to the agribusiness world, professionalism, current topics of special interest, and financial and legal implications of modern agricultural production. *Preq:* Senior standing in Agricultural Mechanization and Business or consent of instructor.

AG M 473 Special Topics in Agricultural Mechanization 1-3(1-3,0) Comprehensive study and application of new technologies and methods not covered in existing courses. Emphasis is placed on independent study using innovative approaches to problem solving. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

AGRICULTURE

Professors: L. L. Bauer, O. J. Dickerson, R. G. Halfacre, D. E. Linvill, E. L. McLean, V. L. Quisenberry, P. A. Skewes, C. E. Thompson, S. U. Wallace, G. J. Wells; *Associate Professors:* M. Hall, M. E. Richardson; *Assistant Professor:* C. D. White

AGRIC 103 Introduction to Animal Industries 3(3,0)F Fundamental and descriptive aspects of the animal industries as applied biology and major segments of food production and distribution systems. Subject matter is presented by Animal and Veterinary Sciences Department.

AGRIC 104, H104 Introduction to Plant Sciences 3(3,0)S Fundamental course in plant sciences, including agronomic and horticultural crops of the major agricultural areas of the world and emphasizing the crops of South Carolina.

AGRIC 105 Agriculture and Society 3(3,0)F Examination of the structure, function, and importance of the food and resource base, production, supply, marketing, demand, capital, labor markets, and consumption behavior in the U.S.; economic and sociological issues affecting U.S. agriculture.

AGRIC 200 Agricultural Applications of Microcomputers 3(2,2) [C.3] Overview of microcomputer hardware and software encompassing word processing, spreadsheet, database management, utility, and graphic communications. Also includes specialized farm and agribusiness management and decision-making programs and criteria for evaluating and selecting hardware.

AGRIC (EN SP) 315, H315 Environment and Agriculture 3(3,0) Survey of the interrelationships of the environment and current agriculture and agricultural practices to include both the environmental impacts of agriculture and the role of agriculture in conservation and improving the environment. *Preq:* Sophomore standing and two semesters of biology or chemistry.

AGRIC 440, 640 Microclimatology 3(3,0) Study of energy balance in earth's atmosphere and soil: solar and thermal radiation, air and soil temperature, humidity, evaporation and the hydrologic cycle, wind fields. Weather variables to describe microclimates and the energy balance of plants, animals, and insects. Modification of microclimates. Rural and urban climates. *Preq:* PHYS 240 or equivalent or consent of instructor; second semester Junior standing.

AGRIC H491 Senior Honors Research 3(1,6) Senior division honors research in an agricultural sciences curriculum. In consultation with and under the direction of a professor, students select a research topic, conduct experiments, record data, and make oral presentations of results to the College Honors Program Committee. Open to approved Honors Program students only.

AGRIC H492 Senior Honors Research 3(1,6) Continuation of AGRIC H491. Senior division honors research in an agricultural sciences curriculum. Upon termination of the research project, students submit formal written reports and make final oral presentations of results to the College Honors Program Committee. Professor-student discussions of additional topics will be arranged.

AGRICULTURE, FORESTRY, AND LIFE SCIENCES

AFLS 191 Directed Research 1-3(0,3-9) Research projects, supervised by faculty in the College of Agriculture, Forestry, and Life Sciences introducing research methods. Restricted to outstanding high school students, selected using Governor's School for Science and Mathematics ranking criteria. May be repeated for a maximum of six credits. *Preq:* Entering high school junior or senior status and permission of faculty research supervisor and department in which research is conducted.

AMERICAN SIGN LANGUAGE

Associate Professor: W. A. Brant

A S L 101 American Sign Language I 4(3,1) Introduction to the basics of American Sign Language, its history, and culture. Visual-gestural communication techniques are used.

A S L 102 American Sign Language I 4(3,1) Continuation of A S L 101 and culture, to develop further communicative competencies. Proficiency oriented with the use of visual-gestural communication skills. *Preq:* A S L 101 or permission of instructor.

A S L 201 American Sign Language II 3(3,0) Continuation of A S L 102. Covers additional vocabulary, sentences, and grammar structures. Main focus is on conversational and receptive skills as well as a better understanding of Deaf culture. *Preq:* A S L 102 or permission of instructor.

A S L 202 American Sign Language II 3(3,0) Continuation of A S L 201, concentrating on intermediate conversational and discourse skills using American Sign Language, more complex American Sign Language grammar, reading comprehension, and composition of short stories, narratives, and dialogues with an emphasis on topics related to the Deaf community. Class is conducted totally in American Sign Language using visual-gestural communicative techniques. *Preq:* A S L 201 or permission of instructor.

ANIMAL AND VETERINARY SCIENCES

Professors: J. A. Bertrand, G. P. Birrenkott, Jr., *Chair*; A. B. Bodine II, D. L. Cross, J. R. Diehl, T. Gimenez, T. C. Jenkins, J. C. McConnell, Jr., D. V. Maurice, T. R. Scott, P. A. Skewes, J. C. Spitzer, C. E. Thompson, R. J. Thurston; *Associate Professors:* A. K. Greene, M. A. Hall, M. E. Richardson; *Assistant Professor:* K. J. K. Getty; *Lecturer:* P. A. Evans

AVS 100 Orientation to Animal, Dairy, and Veterinary Sciences 1(2,0)F Study of the role of animal agriculture in the world today with emphasis on supply and demand of end products and careers available in the animal industry.

AVS 101 Dairy Foods 1(1,0) Production aspects of dairy foods from the farmer to the consumer including such products as ice cream, yogurt, and various cheeses; the use of these foods for nutrition and pleasure. Students who have received credit for ADVSC 307 will not be allowed to enroll in or receive credit for AVS 101.

AVS 102 Mammalian Reproduction 1(1,0) Physiology and endocrinology of the reproductive processes in male and female mammals with emphasis on farm animals. Control of reproductive cycles, diseases, sexuality, and effects of drugs on reproduction are discussed.

AVS 108 Animal and Dairy Science Techniques 1(0,2)S Basic principles in the handling of livestock and techniques of animal industries are discussed. Basics of animal anatomy and equipment and facilities used in animal production are presented.

AVS 110 Avian Pets—Biology and Owner Responsibilities 1(1,0)F Systematic coverage of the many types of birds that humans keep as social companions. Nutrition, environmental considerations, reproductive habits, health, and legal and economic aspects of these pets are considered.

AVS 120 Poultry Techniques 1(0,2)F Basic principles in the handling and production of poultry are discussed and demonstrated. Students receive hands-on experience and visit commercial operations to view equipment, facilities, and production techniques. *Preq:* Consent of instructor.

AVS 201 Poultry Husbandry 3(3,0)F Study of the principles of poultry production and marketing and of the anatomy and physiology of the economically important poultry and game bird species. *Preq:* Consent of instructor.

AVS 202 Introductory Animal Sciences 4(4,0)F Systematic coverage of the basic principles involved in breeding, feeding, management, and product marketing in beef and dairy cattle, swine, sheep, goat, horse, and poultry operations.

AVS 203 Dairy Science Techniques 1(0,2)F Laboratory demonstrating the basics of breeding, feeding, and management of dairy cattle, quality control of milk, and processing of milk and dairy products. *Preq:* AVS 108.

AVS 204 Horse Care Techniques 1(0,2) Common skills to safely handle, restrain, and work around horses with special emphasis on management strategies to optimize the health, comfort, and productivity of the horse. *Preq:* AVS 108.

AVS 205 Light Horse Management 2(1,2)F Light horse industry—development of breeds and their uses. Breeding, feeding, and management of light horses. Fundamental instruction in equitation. *Preq:* AVS 202 and 204 or consent of instructor.

AVS 210 Animal Science Techniques 1(0,2)F Livestock handling techniques used in the animal industry are discussed. Principles of animal care and management for livestock production are emphasized. *Preq:* AVS 108.

AVS 302 Principles of Livestock Selection 2(1,2)S Pedigrees, performance records, and visual appraisal techniques are integrated to teach students to identify livestock to be kept for breeding purposes. Students are eligible to compete in intercollegiate selection contests.

AVS 303 Livestock Evaluation 2(1,2)F Modern selection parameters are integrated with visual appraisal in the identification of body traits that will ultimately affect the market grades and economic value of live animals and their carcasses.

AVS 304 Evaluation of Dairy Products 2(1,2)S Emphasizes sensory evaluation of dairy products; discussion of basic principles of organoleptic evaluation, fundamental rules for scoring and grading dairy products; evaluation of all classes of dairy products based on established grades and score cards.

AVS 305 Meat Grading and Selection 2(1,2)S Classification, grading, and selection of beef, lamb, and pork carcasses and wholesale cuts and factors influencing quality and value are studied. Students are eligible to compete in intercollegiate meat-judging contests.

AVS 309 Principles of Equine Evaluation 2(1,3) Study of conformation as it relates to locomotion, soundness, and breed standards. Includes rules and regulations of performance events and appropriate management of these events. Considerable time is spent judging classes and delivering oral reasons.

AVS 310 Animal Disease and Sanitation 3(3,0)S Basic principles of animal health. Emphasizes disease prevention in beef cattle, dairy cattle, goats, horses, poultry, and swine. The most common and important diseases and zoonosis of farm animals are explained. *Preq:* AVS 202.

AVS 311 Dairy Cattle Selection 2(1,2)S Emphasis is on the selection of dairy cattle for profitable herd operations. Evaluation of herd classification, fitting, showing, and true types is made.

AVS 315 Animal Welfare 3(3,0) Discussion of past, present, and future human/animal interaction. Topics include wild animals, domestication, animal welfare organizations, animal rights organizations, welfare assessment, animal agriculture, animal research, and other current topics. *Preq:* Junior standing.

AVS 320 Veterinary and Medical Terminology 2(2,0) Promotes students' understanding and use of basic scientific and medical terminology and concepts, especially those of basic science, biology, anatomy, physiology, and medicine. *Preq:* BIOL 104.

AVS 323 Poultry and Poultry Products Evaluation 2(0,4) Selection of layers, broilers, and turkeys. Grading of poultry products according to USDA grade standards is also studied. Students are eligible to compete in intercollegiate poultry judging contests. May be repeated for a maximum of four credits.

AVS 330 Animal Pathology 3(3,0)F Acquaints students with animal pathology including cell injury, inflammation, neoplasia, immunologic disease, and pathology of various organ systems. *Preq:* AN PH 301 or consent of instructor.

AVS 353 Meats 2(2,0)S Study of the chemical and physical composition of meat, meat hygiene, nutritive value, curing, freezing, and meat by-products. *Preq:* AVS 108, 202.

AVS 354 Meats Laboratory 1(0,3) Selection and grading of meat animals and carcasses. Practical work in slaughtering of animals and in the cutting, curing, and freezing of meats. Emphasis is on the identification of wholesale and retail cuts. *Preq:* AVS 108, 202.

AVS 355, 655 Poultry Products Grading and Technology 3(2,3)S Odd-numbered years. Factors important in the quality of poultry products are considered. The effects of production, handling, packaging, and storage on consumer acceptability are discussed. Quality evaluation is considered from the standpoint of tenderness, flavor, microbiology, and USDA grades. *Preq:* AVS 108, 202.

AVS 360 Internship 1-12(0,3-36) Off-campus, preplanned, supervised learning opportunity in an area related to animal, dairy, or veterinary science. Students submit periodic written reports and a final written report. To be taken Pass/Fail only. *Preq:* Sophomore standing in Animal and Veterinary Sciences and consent of instructor coordinating internship.

AVS 370, H370 Principles of Animal Nutrition 3(3,0)S Familiarizes students with nutrients and feeds used in livestock and specialty animal production. Methods of evaluating common feedstuffs are covered along with a survey of the functioning of the various digestive systems. Practical aspect to feeding each species is covered. *Preq:* AVS 202, CH 102.

AVS 375, H375 Applied Animal Nutrition 3(2,2)S Students learn procedures for formulating diets that meet nutrient requirements of livestock and poultry, utilizing traditional mathematical approaches and computerized formulation. Computerized least-cost formulation of diets is covered along with familiarization with feeding systems and approaches. *Preq:* AVS 202; to be taken concurrently or following AVS 370.

AVS 385 Equine Behavior and Training 2(0,4) Basic understanding of horse psychology and how it can be modified. Students learn how to safely handle, train, and work with horses in-hand and under saddle. Includes preparation for such diverse events as sales and shows. *Preq:* AVS 108, 202.

AVS 390 Practicum 1-3(0,3-9) On-campus, preplanned, supervised learning experience in an area related to animal, dairy, poultry, or veterinary sciences. Gives experience not covered in other classwork. May be repeated for a maximum of four credits. To be taken Pass/Fail only. *Preq:* Consent of instructor supervising practicum experience.

AVS 400, 600 Avian Physiology 2(2,0)S Even-numbered years. Detailed study of the structure and function of organ systems of avian species with emphasis on digestion and reproduction. Students are given an opportunity to study organ system(s) of their choice using quantitative physiological techniques. *Preq:* AVS 201, AN PH 301 or consent of instructor.

AVS 401, H401, 601 Beef Production 4(3,2)F Breeding, feeding, reproduction, and management of beef cattle are discussed. Emphasis is on production systems integrating disciplines of animal agriculture into management plans and alternatives. Practical applications of beef production and management practices are also presented. *Preq:* AVS 202, 370.

AVS 402, 602 Poultry Management 4(3,2)S Odd-numbered years. Continuation of AVS 201. Emphasizes management, decision making, and application of technology to the commercial production of poultry and poultry products. *Preq:* AVS 201 or consent of instructor.

AVS 403, 603 Laboratory Techniques 3(2,3)F Research and quality control techniques commonly used in dairy science and related agri-sciences. *Preq:* CH 102.

AVS 404, 604 Dairy Cattle Feeding and Management 4(3,2)F Alternate years. Fundamental principles in the care, feeding, and management of dairy cattle of all ages. Topics include general consideration in selecting a breed and the individual cow, calf raising, growth and development of dairy heifers, care and maintenance of the milking herd, and feeding for milk production. *Preq:* AVS 202, 370.

AVS 405 Advanced Selection and Evaluation 2(0,4)F Special and advanced training in selection and evaluation of breeding, performance, and market animals or their products. Species used are beef and dairy cattle, sheep, swine, and horses. *Preq:* AVS 302 or 303 or 304 or 305, 309 or 311 and consent of instructor.

AVS 406 Seminars and Related Topics 2(2,0) Provides opportunity to prepare and deliver orally technical information not fully covered in classwork, to aid in résumé preparation, to introduce interviewing skills, and to acquaint students with industry expectations for Animal and Veterinary Sciences graduates. *Preq:* SPCH 250.

AVS 407, 607 Equine Theriogenology 3(2,2)F Review of reproductive anatomy and physiology in the mare and stallion, induction of estrus and ovulation, practices for optimal reproductive efficiency, semen collection, preservation and transport, embryo transfer, regulatory aspects of reproduction by various breed registries, noninfectious and infectious diseases affecting reproduction, reproductive health management. *Preq:* AVS 453.

AVS 408, H408, 608 Pork Production 4(3,2)S Breeding, feeding, grading, marketing, and management of swine are studied. Practical applications from all phases of the production cycle are outlined in problem form to develop students' problem-solving abilities. *Preq:* AVS 202, 370.

AVS 409, 609 Selected Topics 1-3(1-3,0) Topics of interest to students at the undergraduate, graduate, and professional levels. Provides experience with problems not covered in other courses or on thesis research. May be repeated for a maximum of six credits, but only if different topics are covered.

AVS 412, H412, 612 Horse Production 4(3,2)S Feeding, breeding, and management of the horse discussed in relation to health, genetics, reproduction, nutrition, and selection. *Preq:* AVS 202, 370.

AVS 418, 618 Muscle Biology and Lean Meats 3(2,2) Biology of animal muscle, connective, fat, and bone tissue with laboratory emphasis on low-fat sausages and restructured, value-added meat products. *Preq:* AVS 202.

AVS 422 Special Problems 1-3(0,3-9) Laboratory, library, or field study of problems related to animal, dairy, and veterinary sciences, emphasizing development and testing of hypothesis and reporting of results. May be repeated for a maximum of four credits. *Preq:* Junior standing and consent of instructor supervising the study.

AVS 430, 630 Dairy Processing I 4(3,3)F Alternate years. Processing and distribution of fluid milk and other dairy products with emphasis on composition, quality control, chemical microbiological, and public health aspects. *Preq:* BIOL 104, CH 102.

AVS 431, 631 Dairy Processing II 4(3,3)S Alternate years. Continuation of AVS 430, with emphasis on processing of cultured dairy products and frozen dairy products. Processing procedures, quality control, ingredients, formulations, and compositional and cultural characteristics of cultured and frozen dairy products are discussed. *Preq:* AVS 430.

AVS 451, 651 Poultry Nutrition 2(2,0)F Odd-numbered years. Nutrient requirements of chickens, turkeys, and game birds and methods of determining these requirements are discussed. Deficiencies and excesses of vitamins and minerals and the effects of naturally occurring toxins are considered. Hand formulation and linear programming are introduced.

AVS 452, 652 Poultry Nutrition Laboratory 1(0,3) Provides training in basic laboratory skills and familiarizes students with common laboratory methods used in poultry nutrition.

AVS 453, H453, 653 Animal Reproduction 3(2,2)S Reproductive physiology and endocrinology of mammals with emphasis on farm animals and frequent reference to reproduction in laboratory animals and humans. *Preq:* AN PH 301, AVS 202.

AVS 455, 655 Animal Reproductive Management 1(0,3)S Physiology and endocrinology of pregnant and nonpregnant cows are discussed. Emphasis is on methods of artificial insemination, pregnancy detection, and computer recordkeeping to achieve a high level of reproductive efficiency in cattle. *Preq:* AN PH 301, AVS 202; to be taken concurrently or following AVS 453.

AVS 458, 658 Avian Microbiology and Parasitology 3(3,0)F Even-numbered years. Agents causing poultry diseases; the diagnosis, prevention, and treatment of specific diseases and their economic and public health significance.

AVS 461, 661 Physiology of Lactation 2(2,0)S Anatomy and development of the mammary gland; physiological and biochemical regulation of mammary growth and milk secretion with emphasis on farm animals and reference to other mammals. *Preq:* AVS 202, BIOCH 210.

AVS 470, H470, 670 Animal Breeding 3(3,0)S Fundamental principles relating to the breeding and improvement of livestock including variation, heredity, selection, linebreeding, inbreeding, crossbreeding, and other related subjects. *Preq:* AVS 202 or consent of instructor.

ANIMAL PHYSIOLOGY

(See also courses listed under Animal and Veterinary Sciences and Entomology.)

Professors: G. P. Birrenkott, Jr., A. B. Bodine II, J. R. Diehl, H. E. Farris, Jr., T. Gimenez, T. R. Scott, J. C. Spitzer, R. J. Thurston, J. R. Tomasso, Jr.; *Associate Professors:* J. M. Colacino, M. E. Richardson; *Adjunct Associate Professor:* W. R. Boone; *Adjunct Assistant Professors:* J. A. Long, W. E. Roudebush, H. L. Higdon III

AN PH 301 Physiology and Anatomy of Domestic Animals 4(3,3)F Physiology and associated anatomy of the body systems, including nervous, skeletal, muscular, respiratory, digestive, circulatory, urinary, reproductive, and endocrine systems. Designed primarily for students in Animal and Veterinary Sciences. *Preq:* BIOL 104 or 111.

AN PH 401 Selected Topics 1-3(1-3,0) Comprehensive study of selected topics of interest in animal physiology not covered in other courses. May be repeated once for a maximum of six credits, but only if different topics are covered.

AN PH 460, H460, 660 Systems Physiology 1(1,0)F Physiology of digestive and endocrine systems. *Coreq:* BIOSC 459 or consent of instructor.

ANTHROPOLOGY

Professor: J. M. Coggeshall

ANTH 201 Introduction to Anthropology 3(3,0) Cross-cultural examinations of contemporary human society; physical evolution of humans; development of societies and archaeological record; environmental impact of human societies today.

ANTH 301 Cultural Anthropology 3(3,0) The nature of human culture; the constants and variants in human behavior affecting technology, social relations, social control, family systems, language, religion, and art. *Preq:* ANTH 201 or consent of instructor.

ANTH 320 North American Indian Cultures 3(3,0) American Indian ethnography, using the culture area approach in studying adaptations of native peoples; includes a brief survey of American Indians today. *Preq:* ANTH 201 or consent of instructor.

ANTH 351 Physical Anthropology 3(3,0) Study of humans as biological organisms. Examines human evolution, primate social behavior, human physiological variations and disease resistance, and human skeletal anatomy and forensics.

ANTH 401, 601 Cultures and the Environment 3(3,0) Examines the global impact of humans on the environment. Traces the prehistoric development and historical consequences of population growth, agriculture, political and economic complexity. Future implications are also discussed. *Preq:* ANTH 201 and Junior standing, or consent of instructor.

ANTH 403, 603 Qualitative Methods 3(3,0) Methods and techniques of qualitative field research, including participant observation, ethnographic interviewing, data analysis, and report writing. *Preq:* ANTH 201 or consent of instructor.

ANTH (JAPN) 417 Japanese Culture and Society 3(3,0) See JAPN 417.

ANTH 495 Field Studies 1-6(1-2,2-12) Group field project in settings selected by the instructor to provide students with a variety of exposures to various cultural contexts. Including archaeological digs. Project progress and student interpretations of findings monitored by periodic group meetings and shared experiences. May be repeated for a maximum of six credits. *Preq:* ANTH 403 or consent of instructor.

ANTH 498 Independent Study 3(1,6) Individual readings or projects in anthropological areas not covered in other courses. *Preq:* ANTH 201.

ARCHITECTURE

Professors: J. F. Barker, J. R. Caban, *Chair;* L. G. Craig, M. A. Davis, R. J. Hogan, J. D. Jacques, Y. Kishimoto, R. B. Norman; *Associate Professors:* D. J. Allison, J. A. Burton, H. C. Harritos, N. J. Hurt, R. J. Miller, G. W. Patterson, R. T. Silance; *Assistant Professors:* D. Battisto, P. Del Real, J. A. Erdman, K. E. Green; *Visiting Mickel Assistant Professor:* V. L. Wells-Bowie; *Lecturers:* L. B. Bray, L. A. Brown, A. H. Jacques, P. L. Laurence, M. R. Zell

ARCH 151 Collaborative Studio I 4(2,6) [C.1, O.1] Introduction to principles of architectural design. Collaborative studio offering instruction in the specific skills of formal composition, visual communication, oral presentation, and computer literacy. Critical studies of cannonical texts and buildings serve as the primary vehicle for design discussions.

ARCH 152 Collaborative Studio II 3(1,6) [0.1] Continuation of ARCH 151. Introduction to an elemental vocabulary of architecture within basic spatial design problems, with emphasis on visual communications skills, oral presentations of work, and analysis and discussion of design issues through critical readings of canonical texts and buildings. *Preq:* ARCH 151.

ARCH 201 Introduction to Architecture 3(3,0) Examines basic concepts of architectural design using historic and contemporary examples. Principles of design, programmatic concerns, design documents, and construction are discussed in the context of the practice of architecture.

ARCH 251 Collaborative Studio III 4(1,9) [C.1, O.1] Architectural analysis and design problems focusing on understanding the context of architecture. Specific investigation of the relationship between buildings and the cityscape and landscape. Instruction on visual communications skills, computer modeling, and oral presentation techniques support design discussions. *Preq:* ARCH 152.

ARCH 252 Collaborative Studio IV 4(1,9) [C.1] Continuation of ARCH 251. Architectural design problems with a focus on fundamental organizational, spatial, structural, and constructive principle and their relationship to contextual situations. Instruction on visual communication skills and computer rendering support the design discussions. *Preq:* ARCH 251.

ARCH 351 Architecture Studio I 6(1,11) [W.1] Synthesizes architectural ideas into form; visual, oral, and written communications; and design projects of increasing scale and complexity. Developing the ability to clearly communicate one's thoughts into architectural form is the ultimate objective. *Preq:* ARCH 252.

ARCH 352 Architecture Studio II 6(1,11) [W.1] Continuation of ARCH 351. Studio dealing with urban-based institution design. Housing issues are also explored. Visual, oral, and written communications are stressed within an environment that strives for synthesis of ideas and architectural form. *Preq:* ARCH 351.

ARCH 403, 603 The Modern Architectural Movement 3(3,0) Seminar in the analysis and criticism of architectural and town building works. Course sequence includes historic and contemporary examples, literary searches, field trips, essays, and oral reports. *Preq:* Senior standing or consent of instructor.

ARCH 404, 604 Current Directions in Architecture 3(3,0) Critical analysis of the development and current directions of modern movements in architecture. *Preq:* Senior standing or consent of instructor.

ARCH 405, 605 American Architectural Styles 1650–1950 3(3,0) Survey of American architectural styles and of the architects responsible for them, from the Colonial period to our recent past. Considerable emphasis is placed on identifying those architectural elements which serve as clues in determining a building's architectural style.

ARCH 412, 612 Architectural History Research 3(3,0) Directed investigations related to the art and architectural history of Europe. May be repeated for a maximum of six credits. *Preq:* Junior standing or consent of instructor.

ARCH 414, 614 Design Seminar 3(3,0) Exploration of topical issues in architecture, art, construction, and planning. May be repeated for a maximum of six credits. *Preq:* Junior standing or consent of instructor.

ARCH 415, 615 Field Sketching 3(0,6) Study of media and techniques for expression, representation, and visual analysis through freehand perspective field drawing of the built and natural environment. *Preq:* Junior standing in School of Design and Building or consent of instructor.

ARCH 416, 616 Field Studies in Architecture and Related Arts 3(0,9) Documentation and analysis of architectural structures observed during European travels in graphic and written form. May be repeated for a maximum of six credits. *Preq:* Junior standing or consent of instructor.

ARCH 421 Architectural Seminar 3(3,0) Lectures and seminars dealing with pertinent topics related to environmental and technological considerations in architecture and the building industry. *Preq:* Senior standing or consent of instructor.

ARCH 422 New Directions Seminar 3(3,0) Exploration into careers which relate directly (i.e., construction law) or indirectly (i.e., public relations) to the making of our built environment.

ARCH 424, 624 Product Design 3(0,9) Furniture and product system design with emphasis on ergonomics and the relationship of form and materials. *Preq:* Senior standing and consent of instructor.

ARCH 425, 625 Energy in Architecture 3(3,0) Climate design methodology and its influence on building energy patterns and architectural form. *Preq:* Senior standing and consent of instructor.

ARCH 426, 626 Architectural Color Graphics 3(3,0) Architectural color graphics by computer. Theories of color classification and interaction; application of color theories to art and architecture. *Preq:* Consent of instructor.

ARCH 427, 627 Advanced Color Graphics 3(3,0) Theories of color classification and interaction; three-dimensional color modeling by computer; advanced application of color theories to art and architecture. *Preq:* ARCH 426 or consent of instructor.

ARCH 428, 628 Computer-Aided Design 3(2,3) Introduction to the concepts, skills, and applications of computer-aided design as they relate to the practice of architecture. *Preq:* Senior standing or approval of instructor.

ARCH 429, 629 Architectural Graphics 3(3,0) Provides students with an understanding of the concepts, skills, techniques, and strategies of visual presentation/graphics as they relate to the design professions—architects/landscape architects. *Preq:* Junior standing, or consent of instructor.

ARCH 430, 630 Theories and Philosophies of Technology and Architecture 3(3,0) Theoretical and practical examination of technology and architecture from pre-modern and modern viewpoints to study its nonneutral role in shaping and reflecting knowledge, beliefs, and actions within a cultural context.

ARCH 431, 631 Virtual Reality in Architecture 3(3,0) Introduction and exploration of the theories and concepts of virtual reality and their use in modeling three dimensional spaces. Instruction in computer modeling, lighting, and texture mapping is offered. Projects focus on the creation and presentation of a virtual environment. *Preq:* Junior standing or permission of instructor.

ARCH 440 New York Field Study 3(3,0)M Study of architecture, art, planning, and urban design of New York. Two weeks of residence is required with scheduled field trips to relevant sites in all five boroughs, with counseling to determine research interests. Guidance is provided to resources in the city. A final report is required.

ARCH 451 Architecture Studio III 6(1,11) [W.1] Continuation of ARCH 352. Advanced architectural issues of program and theory, synthesis of ideas, and self-criticism. *Preq:* ARCH 352.

ARCH 452 Architecture Studio IV 6(0,12) Continuation of ARCH 451. Self-directed design studio. Independent study in which students set the parameters of design issues and complete the studio sequence. *Preq:* ARCH 451.

ARCH 485, 685 Health Care Facilities Systems 3(3,0) Introduces concepts, organization, and direction of health and health-care services within the context of health-care delivery systems. Special emphasis is placed on mental and physical health-care facilities concepts. *Preq:* Consent of instructor.

ARCH 488, 688 Health Care Facilities Programming Techniques 3(3,0) Seminar on recent research and innovations in health-care facilities programming and original investigation of assigned programming problems. *Preq:* Consent of instructor.

ARCH 490, H490 Directed Studies 1-5 Comprehensive studies and research of special topics not covered in other courses. Emphasis is on field studies, research activities, and current developments in architecture. May be repeated for a maximum of ten credits. *Preq:* Consent of department chair.

ARCH 557 Architecture Studio 6(0,18) City planning design and the development of complex building solutions.

ARCHITECTURE CHARLESTON PROGRAM

(See courses listed under each field of study.)

Associate Professor: R. J. Miller, *Director; Assistant Professor:* R. T. Huff; *Lecturer:* J. P. Huguley

Located in Charleston, South Carolina, this program is available to qualified undergraduates in Architecture, Art, Construction Science and Management, and Landscape Architecture. Studio work is oriented toward design within this historic seaport setting. Students also enroll in classes at the University of Charleston campus. The program is enriched by visiting scholars and professionals from the area.

ARCHITECTURE OVERSEAS PROGRAM

(See courses listed under each field of study.)

Genoa, Italy: *Associate Professor in Residence:* M. H. Rice; *Lecturers:* F. S. Fera, S. Fera

Barcelona, Spain: *Assistant Professor in Residence:* M. T. Maher; *Lecturers:* X. Costa, J. M. Roldan

The Daniel Center for Urban Studies in Genoa, Italy, is available to qualified Master of Architecture, Construction Science and Management, Fine Arts, City and Regional Planning, and professional year Landscape Architecture students. Studio and classroom work is enriched by visiting scholars and complemented by scheduled field trips, both in Italy and continental Europe. Undergraduate Architecture students in their third or fourth year may also participate in the Italian program.

ART

Professors: S. A. Cross, T. W. Dimond, W. W. Lew, *Chair;* M. V. Vatalaro, S. M. Wang; *Associate Professors:* D. M. Detrich, M. R. Hudson; *Visiting Assistant Professor:* P. J. Shotbolt; *Lecturers:* C. L. Martin, J. P. Tousignant

ART 103 Visual Arts Studio 3(0,6) Studio projects in basic visual elements and principles. The development of creative design process, visual organization, and design skills are introduced as a foundation for further study in visual arts.

ART 151 Foundations in 2D Art 3(0,6) Intensive introduction to the visual arts and design fundamentals including the exploration of the history and practical applications of the elements and principles of design as they relate to two-dimensional art work. *Preq:* Fine Arts major.

ART 152 Foundations in 3D Art 3(0,6) Intensive introduction to the visual arts and design fundamentals, including the exploration of the history and practical applications of elements and principles of design as they relate to three-dimensional art work. *Preq:* Fine Arts major.

ART 153 Orientation to Visual Arts I 1(1,0) Introduction to visual arts profession focusing on issues related to various career opportunities, creativity, problem solving methodologies, and current thinking in contemporary art. *Preq:* Fine Arts major.

ART 154 Orientation to Visual Arts II 1(1,0) Introduction of professional practices related to the visual arts. Addresses issues related to the development and documentation of professional activities in the various studio disciplines as well as health and safety concerns for the studio artist. *Preq:* Fine Arts major.

ART 205 Beginning Drawing 3(0,6) Study of drawing based on the premise that drawing is a foundation discipline in the visual arts. Basic materials and approaches associated with drawing are studied and applied through studio practice, augmented by critiques, demonstrations, and lectures. *Preq:* ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 207 Beginning Painting 3(0,6) Introduction to basic materials, methods, and techniques of painting. Primary medium used is acrylic, and other painting media may also be introduced. Emphasis is on basic skills in painting plus individual creative development. *Preq:* ART 151, 153, 205 (Art majors); ART 103 (non-Art Majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 209 Beginning Sculpture 3(0,6) Studio course investigating the meaning of sculpture through traditional and nontraditional approaches. Establishes a working knowledge of material and process in several media. Personal expression is encouraged and enhanced by employment of problem-solving techniques. Static, temporal, installation, and site specific sculpture is explored. *Preq:* ART 151, 152, 153, 154, 205 (ART majors); ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 211 Beginning Printmaking 3(0,6) Studio course introducing basic techniques of relief printing, intaglio, lithography, silkscreen, and papermaking. Each semester concentrates on two or three of these techniques. Coursework integrates printmaking processes and creativity. *Preq:* ART 151, 152, 153, 154, 205 (Art majors); ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 213 Beginning Photography 3(0,6) Introduction to the use of photography as an art medium. Lectures and studio work cover the utilization of the camera, processing and printing in black and white, with emphasis on perception and creative expression. *Preq:* ART 151, 152, 153, 154, 205 (Art majors); ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 215 Beginning Graphic Design 3(0,6) Introduction to fundamental techniques, concepts, and principles of visual communication. Through a series of projects and studio work, students explore techniques of communication through the use of type design, typography, photography, illustration, symbolism, and product design. Individual creative development is stressed. *Preq:* ART 151, 152, 153, 154, 205 (Art majors); ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 217 Beginning Ceramics 3(0,6) Basic studio course introducing ceramic arts through its various processes and techniques. Hand building methods as well as throwing on the potter's wheel are developed. Weekly projects emphasize imagination, self-expression, and skill development. Ceramic history is introduced through slide lectures. *Preq:* ART 151, 152, 153, 154, 205 (Art majors); ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 219 Beginning Papermaking 3(0,6) Explores paper, not just as a surface to receive an image, but as a material capable of being an artistic expression in and of itself. *Preq:* ART 151, 152, 153, 154, 205 (Art majors); ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 305 Drawing 3(0,6) Study of human figure drawing with primary emphasis on drawing from live models. Student's drawing skills and fundamental understanding of the structure and form of the human figure are reviewed through studio practice, augmented by critiques, demonstrations, and lectures. *Preq:* ART 205 or consent of instructor.

ART 307 Painting 3(0,6) Continuation of ART 209 with increased emphasis on personal expression and growth in technical competence. Some study of painting history is included in studio activity. *Preq:* ART 207 or consent of instructor.

ART 308 Painting Research I 1-3(0,2-6) Continuation of ART 307. Technical and conceptual research in painting to further develop self-expression. Special projects are developed in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 307 or consent of instructor.

ART 309 Sculpture 3(0,6) Continuation of ART 209 with increased emphasis on personal expression and content of work. Further exploration of materials and processes including an introduction to foundry casting and advanced welding techniques. Individual investigation into current and historical aspects of sculpture is required. *Preq:* ART 209 or consent of instructor.

ART 310 Sculpture Research I 1-3(0,2-6) Continuation of ART 309. Technical and conceptual research in sculpture to further develop self-expression. Special projects are developed in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 309 or consent of instructor.

ART 311 Printmaking 3(0,6) Continuation of processes in beginning printmaking with emphasis on expanding the range and depth of technique. The relationship of technique and process to creative idea development is emphasized. *Preq:* ART 211 or consent of instructor.

ART 312 Printmaking Research I 1-3(0,2-6) Continuation of ART 311. Technical and conceptual research in printmaking to develop self-expression. Special projects are constructed in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 311 or consent of instructor.

ART 313 Photography 3(0,6) Continuation of ART 213. Advanced techniques and more diverse types of film and paper are used in making images of personal and expressive nature. The design and construction of a view camera, printing in color, and multiple imagery may also be included. *Preq:* ART 213 or consent of instructor.

ART 314 Photography Research I 1-3(0,2-6) Continuation of ART 313. Technical and conceptual research to develop personal and expressive work in photography. Projects are chosen in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 313 or consent of the instructor.

ART 315 Graphic Design 3(0,6) Continuation of concepts and techniques introduced in ART 215 with emphasis on more applied projects. Individual creative solutions are emphasized. *Preq:* ART 215 or consent of instructor.

ART 317 Ceramic Arts 3(0,6) Continuation of skill development leading to more challenging projects and independent efforts. Further exposure to ceramic history and ceramic technology is presented. *Preq:* ART 217 or consent of instructor.

ART 318 Ceramics Research I 1-3(0,2-6) Continuation of ART 317. Technical and conceptual research in ceramics for the purpose of self-expression. Projects are constructed in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 317 or consent of instructor.

ART 321 Art with the Computer 3(0,6) Studio course using the microcomputer as an art medium. Studies in imaging systems, with emphasis on the creative use of the medium for artistic expression. *Preq:* ART 151, 152, 153, 154, 205 (Art majors); ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 322 Art with Computer Research I 1-3(0, 2-6) Continuation of ART 321. Technical and conceptual research to develop personal and expressive work in computer imaging. Projects are chosen in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 321 or consent of instuctor.

ART 405, 605 Advanced Drawing 3(0,6) Advanced level studies of drawing which explore the synthesis of refined drawing skills and philosophies of art. Students' understanding of drawing as a form of art is developed through studio practice augmented by critiques, demonstrations, lectures, field trips, and independent research. *Preq:* ART 305 or consent of instructor.

ART 406 Drawing Research II 1-3(0,2-6) Continuation of ART 405. Technical and conceptual research in drawing to further develop self-expression. Special projects are developed in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 405 or consent of instructor.

ART 407, 607 Advanced Painting 3(0,6) Advanced studio course in painting. Students select painting media and develop a strong direction based on prior painting experience. Study of contemporary painters and directions is included. *Preq:* ART 307 or consent of instructor.

ART 408 Painting Research II 1-3(0,2-6) Continuation of ART 407. Technical and conceptual research in painting to further develop self-expression. Special projects are developed in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 407 or consent of instructor.

ART 409, 609 Advanced Sculpture 3(0,6) Intensive independent studio concentration to further develop personal direction and content. Continued investigation of sculptural context, materials and processes, and relative historical research is emphasized. *Preq:* ART 309 or consent of instructor.

ART 410 Sculpture Research II 1-3(0,2-6) Continuation of ART 409. Technical and conceptual research in sculpture to further develop self-expression. Special projects are developed in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 409 or consent of instructor.

ART 411, 611 Advanced Printmaking 3(0,6) Culmination of process, techniques, and individual development. Students are expected to have mastered process and technique for the benefit of the image produced. Creativity and self-expression are highly emphasized as students select a process for concentrated study. *Preq:* ART 311 or consent of instructor.

ART 412 Printmaking Research II 1-3(0,2-6) Continuation of ART 411. Technical and conceptual research is further developed by students for the purpose of self-expression. Special projects are constructed in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 411 or consent of instructor.

ART 413, 613 Advanced Photography 3(0,6) Continuation of ART 313. Advanced problems in photography. *Preq:* ART 313 or consent of instructor.

ART 414 Photography Research II 1-3(0,2-6) Continuation of ART 413. Technical and conceptual research in photography to develop students' creative vision. Projects are developed in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 413 or consent of instructor.

ART 415 Advanced Graphic Design 3(0,6) Continuation of ART 315. Personal expression through communication techniques is further explored. Individual projects are emphasized. *Preq:* ART 315 or consent of instructor.

ART 417, 617 Advanced Ceramic Arts 3(0,6) Students are directed toward further development of ideas and skills. Glaze calculation and firing processes are incorporated to allow for a dynamic integration of form and ideas. *Preq:* ART 317 or consent of instructor.

ART 418 Ceramics Research II 1-3(0,2-6) Continuation of ART 417. Technical and conceptual research in ceramics for the purpose of self-expression. Projects are chosen in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 417 or consent of instructor.

ART 420, 620 Selected Topics in Art 1-3(0,6-9) Intense course in studio art. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Senior standing or consent of instructor.

ART 471 Bachelor of Fine Arts Senior Studio I 5(0,15) Individual studio project directed by an instructor and determined by the student in consultation with the instructor. Usually focuses on a particular studio area, concept, or theme. *Preq:* Senior standing and completion of 300/400 sequence in the discipline in which students choose to complete senior studio.

ART 472 Bachelor of Fine Arts Senior Studio II 5(0,15) Individual studio project directed by an instructor and determined by the student in consultation with the instructor. Usually focuses upon a particular studio area, concept, or theme. *Preq:* ART 471, Senior standing.

ART 490, H490, 690 Directed Studies 1-5(0,2-10) Study of areas in the visual arts not included in other courses or additional advanced work. Must be arranged with a specific instructor prior to registration. May be repeated for a maximum of 18 credits. *Preq:* Consent of instructor.

ART AND ARCHITECTURAL HISTORY

Professors: W. W. Lew, *Chair*, E. C. Voelker; *Associate Professors:* J. B. LeBlanc, G. L. Walker; *Lecturer:* D. W. Houston

A A H 101, H101 Survey of Art and Architectural History I 3(3,0) Comprehensive survey of art and architectural history of Western heritage as well as significant coverage of Asian, African, Native American, and South American art. The arts are studied within the contexts of history, geography, politics, religion, and culture. Survey includes Ancient through Gothic.

A A H 102, H102 Survey of Art and Architectural History II 3(3,0) Survey of Renaissance, Baroque, and Neoclassical art and architecture. Introduction to the Modern Movement in Europe and America. *Preq:* A A H 101.

A A H 203, H203 History and Theory of Architecture I 3(3,0) First of a two-semester sequence of special topics and issues in the history of architecture. Emphasis is on architectural theory and practice in the past and present. Analysis of differing approaches to history: chronological, typological, thematic, phenomenological. *Preq:* A A H 102.

A A H 204, H204 History and Theory of Architecture II 3(3,0) Second of a two-semester sequence on special topics and issues in the history of architecture. Emphasis is on typologies of the house, governmental buildings, and sacred architecture. New directions in architectural historiography. *Preq:* A A H 203.

A A H 205, H205 History and Theory of Art I 3(3,0) First of a two-semester sequence on special topics and issues in the history of art. Emphasis is on stylistic developments and specific art movements. Analysis of art within the larger context of social, political, and religious history. Examination of art techniques and theory as they have developed. *Preq:* A A H 102.

A A H 206, H206 History and Theory of Art II 3(3,0) Second of a two-semester sequence on special topics and issues in the history of art. Continued emphasis on stylistic developments and art movements, with specific attention directed toward post-Renaissance art. Analysis of the influence of past history on modern. *Preq:* A A H 205.

A A H 210, H210 Introduction to Art and Architecture 3(3,0) One-semester lecture survey that introduces to the nonmajor an overview of art and architecture from different time periods and cultures. Students are encouraged to appreciate the contribution to art made by the great masters and to discern different styles, art techniques, and creative traditions.

A A H 305 Contemporary Art History 3(3,0) Study of contemporary art from World War II to the present, exploring forces that have shaped various movements and directions. *Preq:* A A H 206.

A A H H330 Honors Colloquium 3 Undergraduate honors colloquium with emphasis on interdisciplinary interpretations. An integration of art, architecture, landscape, and city planning. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 391 Italian Studies Abroad I 3-6(3-6,0) SS On-site exposure of specific works of art and architectural monuments in Italy, coupled with lectures and study problems. May be taught alternately as a compact short course during the academic year with a short stay in Italy or during the summer with an extended foreign experience. May not be taken Pass/Fail. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 392 British Studies Abroad I 3(3,0) On-site exposure to specific works of art and architectural monuments in Great Britain, coupled with lectures and study problems. May be taught alternately as a compact short course during the academic year with a short stay in Britain or during the summer with an extended foreign experience. May not be taken Pass/Fail. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 393 French Visual Studies Abroad I 3(3,0) On-site exposure to specific works of art and architectural monuments in France, coupled with lectures and study problems. May be taught alternately as a compact short course during the academic year with a short stay in France, or during the summer with an extended foreign experience. May not be taken Pass/Fail. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 394 Northern European Visual Studies Abroad I 3(3,0) On-site exposure to art and architecture in Northern European countries such as Belgium, Germany, and Holland coupled with lectures and study problems. May be taught alternately as a compact course during academic year with short stay in Northern Europe, or during summer with extended foreign experience. May not be taken Pass/Fail. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 395 Special Topics in Visual Studies Abroad I 3(3,0) On-site exposure to art and architecture in foreign countries, coupled with lectures and study problems. Different countries may be selected for study at faculty discretion. May be taught as a compact course during academic year with short stay in foreign country, or during summer with extended foreign experience. May not be taken Pass/Fail. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 396 Special Topics in Visual American Studies I 3(3,0) On-site exposure to specific works of art and architectural monuments throughout the U.S., coupled with lectures and study problems. May be taught alternately as a compact short course during the academic year with a short trip to areas of interest, or during the summer with extended travel. May not be taken Pass/Fail. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 411, 611 Directed Research in Art and Architectural History 3(3,0) Comprehensive studies and research of special topics not covered in other courses. Emphasis is on field studies, research activities, and current developments in art history.

A A H 412, 612 Directed Research in Art and Architectural History 3(3,0) Continuation of A A H 411.

A A H 416 History of Landscape Architecture 3(3,0) Planetary survey of notable examples of mankind's constant efforts to arrange and bring order to his environment by design on the land. *Preq:* Junior standing or consent of instructor.

A A H 423, 623 Studies in the Art and Architecture of the Renaissance I 3(3,0) Consideration of the visual arts and architectural monuments of the Renaissance (Western Europe from the 15th–18th centuries), with a study in depth of selected examples from the period. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 424, 624 Studies in the Art and Architecture of the Renaissance II 3(3,0) Consideration of the visual arts and architectural monuments of the Renaissance (Western Europe from the 15th–18th centuries), with a study in depth of selected examples from the period. *Preq:* A A H 423.

A A H 428, 628 Nineteenth Century Visual Arts 3(3,0) Consideration of the visual arts of the 19th century: painting, sculpture, printmaking, ceramics, and so forth, in relation to the factors that have influenced the artist and the consequence on society. *Preq:* A A H 427.

A A H 429, 629 Studies in the Art and Architecture of India and the Far East 3(3,0) Consideration of the visual arts and architectural monuments of India and the Far East, with a study in depth of selected examples from the period. *Preq:* A A H 204 or 206 or consent of instructor.

A A H 430, 630 Twentieth Century Art I 3(3,0) Acquaints students with the major artists' monuments and issues of the Modern period in art. Through lecture/discussions and the reading of primary sources, course places the major modern movements in the context of the period (1860s–1945). *Preq:* Consent of instructor.

A A H 432, 632 Twentieth Century Art II 3(3,0) Overview of trends in art and architecture since World War II. Specific artists, artworks, and movements are presented in a socio/historic context with specific emphasis on the transition from a late-modernist to a post-modern perspective. *Preq:* Consent of instructor.

A A H (PHIL) 433, 633 Issues in Contemporary Art and Philosophy 3(3,0) See PHIL 433.

A A H 435, 635 Studies in Precolumbian Art and Architecture 3(3,0) Familiarizes students with the art and architecture of the Western Hemisphere's Precolumbian culture in Mexico, Central, and South America. *Preq:* A A H 102 or 210 or consent of instructor.

ASTRONOMY

Professor: D. D. Clayton; *Associate Professors:* P. J. Flower, D. H. Hartmann, M. D. Leising, B. S. Meyer

ASTR 101 Solar System Astronomy 3(3,0) Descriptive survey of the universe, with emphasis on basic physical concepts and the objects in our solar system. Related topics of current interest are included. For nonscience majors. May not be taken by students who have completed ASTR 301.

ASTR 102 Stellar Astronomy 3(3,0) Descriptive survey of the universe, with emphasis on basic physical concepts and galactic and extragalactic objects. Related topics of current interest are included. For nonscience majors. May not be taken by students who have completed ASTR 302.

ASTR 103 Solar System Astronomy Laboratory 1(0,2) Optional laboratory to accompany ASTR 101. Demonstrations, laboratory exercises, and planetarium visits supplement the lecture course. *Coreq:* ASTR 101.

ASTR 104 Stellar Astronomy Laboratory 1(0,2) Optional laboratory to accompany ASTR 102. Demonstrations, laboratory exercises, and planetarium visits supplement the lecture course. *Coreq:* ASTR 102.

ASTR (GEOL) 220 Planetary Science 3(3,0) See GEOL 220.

ASTR 302 Stellar Astrophysics 3(3,0) Study of the basic physical concepts necessary for understanding the sun, other stars, and their evolution. Topics include star formation, stellar structure and evolution, binary stars, and observational techniques. *Preq:* PHYS 221 or consent of instructor.

ASTR 303 Galactic Astrophysics 3(3,0) Study of basic physical concepts necessary for understanding the structure of the galaxy, the motions of the stars within it, the nature of the interstellar matter, other galaxies, the large-scale structure of the universe, and the origin of the solar system. *Preq:* PHYS 221 or consent of instructor.

ASTR 475 Selected Topics in Astrophysics 1-3(0-3,0-9) Comprehensive study of an area of astrophysics. Topics may include nucleosynthesis and stellar evolution, extragalactic distance scale, structure and evolution of galaxies, and large-scale structure of the universe. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* ASTR 302 or consent of instructor.

BIOCHEMISTRY

Professors: A. G. Abbott, R. H. Hilderman, G. L. Powell, J. K. Zimmerman; *Associate Professor:* W. R. Marcotte, Jr.; *Assistant Professors:* W. Cao, J. K. Frugoli

BIOCH 210 Elementary Biochemistry 3(3,0) Discussion of the kinds of compounds found in living organisms, their biochemical reactions and significance. *Preq:* CH 102 .

BIOCH 211 Elementary Biochemistry Laboratory 1(0,3) Introduces students to basic biochemical techniques. *Preq:* BIOCH 210.

BIOCH 301 General Biochemistry 3(3,0) Introduction to the nature, production, and replication of biological structure at the molecular level and its relation to function. *Preq:* Organic Chemistry.

BIOCH 302 Molecular Biology Laboratory 1(0,3) Laboratory to accompany BIOCH 301. Introduction to fundamental laboratory techniques in biochemistry and molecular biology and a demonstration of some of the fundamental principles of molecular biology discussed in BIOCH 301. *Preq:* Organic Chemistry. *Coreq:* BIOCH 301.

BIOCH 406, 606 Physiological Chemistry 3(3,0) Chemical basis of the mammalian physiological processes of muscle contraction, nerve function, respiration, kidney function, and blood homeostasis is studied. Composition of specialized tissue such as muscle, nerve, blood, and bone and regulation of water, electrolytes, and acid-base balance are discussed. *Preq:* BIOCH 210 or Organic Chemistry.

BIOCH 423, 623 Principles of Biochemistry 3(3,0) Study of the chemistry of amino acids, monosaccharides, fatty acids, purines, pyrimidines, and associated compounds leads to an understanding of their properties and the relationship between structure and function that makes them important in biological processes. The use of modern techniques is stressed. *Preq:* CH 224 or equivalent.

BIOCH 431, H431, 631 Physical Approach to Biochemistry 3(3,0) Study of chemical and physical properties of amino acids, lipids, nucleic acids, sugars, and their biopolymers. Physical and mathematical analyses are correlated with biological structure and function. *Preq:* BIOCH 301 with a C or higher or consent of instructor. *Coreq:* Physical Chemistry.

BIOCH 432, H432, 632 Biochemistry of Metabolism 3(3,0) Study of the central pathway of carbohydrate, lipid, and nucleotide metabolism. Bioenergetics, limiting reactions, and the regulation and integration of the metabolic pathways are emphasized. *Preq:* BIOCH 423 or 431 or consent of instructor.

BIOCH 433, 633 General Biochemistry Laboratory I 2(0,4) Experiments selected to illustrate current methods used in biochemical research. *Preq:* Concurrent enrollment in BIOCH 423 or 431.

BIOCH 434, 634 General Biochemistry Laboratory II 2(0,4) Continuation of BIOCH 433. *Preq:* Concurrent enrollment in BIOCH 432.

BIOCH 436, 636 Nucleic Acid and Protein Biosynthesis 2(2,0) Examines how nucleic acids and proteins are synthesized in prokaryotic and eukaryotic cells. Designed for students interested in biochemistry, cell biology, molecular biology, and cell physiology. *Preq:* BIOCH 423, 431 or 432 or permission of instructor.

BIOCH 491, H491 Special Problems in Biochemistry 1-8(0,3-24) Orientation in biochemical research (i.e., experimental planning, execution, and reporting). May be repeated for a maximum of eight credits.

BIOENGINEERING

Professors: R. L. Dooley, *Chair;* M. LaBerge, S. Saha; *Associate Professors:* J. J. Hickman, R. A. Latour, Jr.; *Assistant Professors:* P. T. Boland, K. L. Burg, N. R. Vyavahare; *Visiting Associate Professor:* V. M. Gharpuray

BIO E 201 Organs and Their Replacements 3(3,0)F Provides engineering, biological, and physical science students with an overview of the replacement of human body parts and the problems related to artificial devices.

BIO E 302 Biomaterials 3(3,0)S Study of metallic, ceramic, and polymer materials used for surgical and dental implants; materials selection, implant design, physical and mechanical testing; corrosion and wear in the body. In addition, physical and mechanical properties of tissue as related to microstructure are studied. *Preq:* C M E 210 or consent of instructor.

BIO E 320 Biomechanics 3(3,0)S Study of relation between biological and mechanical functions of musculoskeletal tissues such as bone, ligaments, muscles, cartilage, etc.; mechanics of human joints; analysis of implants and implant failure. *Preq or Coreq:* E M 304 or consent of instructor.

BIO E 401 Biomedical Design 3(3,0)F Covers basic steps in designing medical devices intended for short- or long-term implantation. Materials selection, fabrication processes, performance standards, cost analysis, and design optimization are covered. Design project is required. For engineering majors only. *Preq:* BIO E 302, 320, E M 304.

BIO E 420 Sports Engineering 3(3,0) Study of engineering principles involved in sports: body systems in human motion, analysis of gait, basic performance patterns in athletic movements, performance improvements, design of sports equipment. *Preq:* BIO E 302 and 320 or consent of instructor.

BIO E 450, H450 Special Topics in Bioengineering 1-4(1-4,0) Comprehensive study of a topic of current interest in the field of biomedical engineering under the direct supervision and guidance of a faculty member. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

BIO E (C M E) 480, 680 Research Principles and Concepts 1(1,0) Introduces seniors and graduate students to principles and practices of scientific research. Topics include developing scientific concepts, developing projects, pursuing research, collaborating in multi-disciplinary teams, patenting and publishing technical and scientific information, and reviewing professional and ethical standards of performance. To be taken Pass/Fail only.

BIOLOGICAL SCIENCES

Professors: R. E. Ballard, N. D. Camper, L. A. Dyck, S. A. Gauthreaux, Jr., T. M. McInnis, Jr., *Chair;* G. P. Noblet, E. B. Pivorun, E. E. Ruppert, J. E. Schindler, A. P. Wheeler, R. A. Wing, J. B. Wourms; *Associate Professors:* J. M. Colacino, R. R. Montanucci, B. J. Speziale, T. P. Spira, L. A. Temesvari, D. W. Tonkyn

BIOSC 101 Frontiers in Biology I 1(1,0) Introduces Biological Sciences majors to recent advances in molecular and cellular biology. Areas covered include genetic engineering, genetics, cell biology and development. *Coreq:* BIOL 103 or 110 or permission of course coordinator.

BIOSC 102 Frontiers in Biology II 1(1,0) Introduces Biological Sciences majors to recent advances in organismal and evolutionary biology. Topics include ecology, evolution, behavior, and organismal biology. *Preq:* BIOL 103 or 110 or consent of course coordinator.

BIOSC 200 Biology in the News 3(3,0) For non-science majors. Students examine current topics of biology appearing in newspapers and other current media. Uses a problem-based learning approach, with students working as teams and individually on areas of interest identified by the class. *Preq:* ENGL 102, General Education Science Requirements.

BIOSC 205 Plant Form and Function 3(3,0) Introductory course for students majoring in plant sciences. Integrates lecture and laboratory and emphasizes fundamental structures and functions of higher plants. *Preq:* BIOL 103 or consent of instructor.

BIOSC 206 Plant Form and Function Laboratory 1(0,3) Laboratory for BIOSC 205. *Preq* or *Coreq:* BIOSC 205 or consent of instructor.

BIOSC 222 Human Anatomy and Physiology I 4(3,3) Basic introductory course in integrated human anatomy and physiology covering cells and tissues; integumentary, skeletal, muscular and nervous systems; sensory organs. Physiology is stressed. Structured primarily for Nursing and other health-related curricula. *Preq:* BIOL 103 or 110; CH 101 and 102 or 105 and 106.

BIOSC 223 Human Anatomy and Physiology II 4(3,3) Continuation of BIOSC 222 covering endocrine, reproductive, cardiovascular, lymphatic, respiratory, urinary, and digestive systems; fluid and electrolyte balance. Physiology is stressed. *Preq:* BIOSC 222 or permission of instructor.

BIOSC 302, H302 Invertebrate Biology 3(3,0) In-depth survey and comparison of free-living invertebrate animals emphasizing functional anatomy, development, and evolutionary relationships. *Preq:* Introductory two-semester biology sequence with laboratory. *Coreq:* BIOSC 306.

BIOSC 303, H303 Vertebrate Biology 3(3,0) Comprehensive survey of vertebrate animals including their taxonomy, morphology, evolution, and selected aspects of the natural history and behavior. *Preq:* Introductory two-semester biology sequence with laboratory.

BIOSC 304, H304 Biology of Plants 3(3,0) Survey of the major groups of plants, their biology, diversity, and evolution. *Preq:* BIOL 104 or 111 or BIOSC 205.

BIOSC 305, H305 Biology of Algae and Fungi 3(3,0) Introduction to the biology of the major groups of algae and fungi. Emphasizes how select representatives of the algae and fungi are adapted to their environment through structural, physiological, and life-cycle modifications. *Preq:* BIOL 104 or 111 or BIOSC 205.

BIOSC 306 Invertebrate Biology Laboratory 1(0,3) Survey and comparison of the biology of living invertebrates, examples of which are drawn primarily from the southeastern coast of the United States. *Preq:* Introductory two-semester biology sequence with laboratory. *Coreq:* BIOSC 302.

BIOSC 307 Vertebrate Biology Laboratory 1(0,3) Comparative and phylogenetic study of the gross morphology of vertebrates. *Preq or Coreq:* BIOSC 303.

BIOSC 308 Biology of Plants Practicum 1(0,3) Laboratory exercises that explore the major groups of plants, their biology, diversity, and evolution. *Preq or Coreq:* BIOSC 304.

BIOSC 309 Algae/Fungi Practicum 1(0,3) Practice in the manipulation and examination of selected algae and fungi, with emphasis on culture techniques and examination of the structure and adaptations of the algae and fungi to different environments. *Preq or Coreq:* BIOSC 305.

BIOSC (W F B) 313 Conservation Biology 3(3,0) See W F B 313.

BIOSC 320 Field Botany 4(2,4) Introductory study of the taxonomy, ecology, and evolution of plants in their natural environment with an emphasis on identification and characteristics of representative species and plant communities in the Carolinas. Includes one or two required Saturday field trips. *Preq:* BIOL 104, 111, or BIOSC 205, or permission of instructor.

BIOSC 335 Evolutionary Biology 3(3,0) Introduction to basic concepts and underlying principles of modern evolutionary biology. Topics include a historical overview of evolutionary theories, elementary population genetics, principles of adaptation, speciation, systematics and phylogenetic inference, fossil record, biogeography, molecular evolution, and human evolution. *Preq:* GEN 302 or equivalent.

BIOSC 336, H336 Computers in Life Sciences 3(1,4) Use of computers, video, and communication technologies in the life sciences is explored through demonstration, discussion, and collaborative projects that prepare students to use modern technology in research, learning, communicating, and public presentation of biological principles and phenomena. *Preq:* BIOL 104 or 111 or permission of instructor.

BIOSC 401, H401, 601 Plant Physiology 3(3,0) Relations and processes pertaining to maintenance, growth, and reproduction of plants, including absorption of matter and energy, water relations of the plant, utilization of reserve products and liberation of energy. *Preq:* BIOL 104 or 111 or BIOSC 205 and CH 102. *Coreq:* BIOSC 402.

BIOSC 402, 602 Plant Physiology Laboratory 1(0,3) Laboratory exercises and experiments designed to indicate the relations and processes which pertain to maintenance, growth, and reproduction of plants, including absorption of matter and energy, water relations of the plant, utilization of reserve products, and liberation of energy. *Coreq:* BIOSC 401.

BIOSC 403, H403, 603 Protozoology 3(3,0) Survey of the protozoa with emphasis on organization and function. Representative types of both free-living and parasitic forms are examined for each major taxon. *Preq:* BIOL 104 or 111.

BIOSC 404, H404, 604 Protozoology Laboratory 2(1,2) Laboratory exercises reinforce the material presented in BIOSC 403 and introduce students to techniques used in collection, preservation, and examination of protozoans. *Coreq:* BIOSC 403.

BIOSC 405, H405, 605 Molecular Genetics of Eukaryotes 3(3,0) Molecular genetic analyses of eukaryotes in relation to mutations and repair, complex phenotypes, biochemical pathways, short- and long-term regulation of gene expression, and evolution. *Preq:* GEN 302 or equivalent and one semester of biochemistry, or consent of instructor.

BIOSC 406, H406, 606 Introductory Plant Taxonomy 3(3,0) Introduction to the basic principles and concepts of plant systematics with emphasis on the plants of South Carolina. *Preq:* BIOL 104 or 111 or BIOSC 205. *Coreq:* BIOSC 407.

BIOSC 407, 607 Plant Taxonomy Laboratory 1(0,3) Introduction to basic techniques of plant taxonomy with laboratory and field emphasis on the flora of South Carolina. *Coreq:* BIOSC 406.

BIOSC 408, H408, 608 Comparative Vertebrate Morphology 3(3,0) Phylogeny and diversity of vertebrates and study of their comparative morphology, leading to an understanding of the relationships and functioning of living organisms. *Preq*: BIOL 104 or 111. *Coreq:* BIOSC 409.

BIOSC 409, H409, 609 Comparative Vertebrate Morphology Laboratory 1(0,3) Comparative anatomy of representative vertebrates; methods used in preparing specimens for study and display. *Coreq:* BIOSC 408.

BIOSC 410, 610 Limnology 3(3,0) Detailed introduction to the physical, chemical, and biological interrelationships that characterize inland water environments. A fundamental approach to the interactions of components of the environment is developed at a theoretical level. *Preq:* Junior standing in a life science or consent of instructor.

BIOSC 411, H411, 611 Limnological Analyses 2(1,2) Examines a broad range of topics covered with both standing and running fresh waters. About one-third of the laboratory exercises address the major physical components of lakes and streams. The remainder provide rationale and methods for quantitative analyses of biota, as well as some integrated analyses of whole ecosystems. *Preq or Coreq:* BIOSC 410 or 443.

BIOSC (E N R) 413 Restoration Ecology 3(3,0) See E N R 413.

BIOSC (GEN) 416, 616 Recombinant DNA 3(3,0) See GEN 416.

BIOSC 417, 617 Marine Biology 3(3,0) Survey of the organisms that live in the sea and their adaptations to the marine environment. Characteristics of marine habitats, organisms, and the ecosystems are emphasized. *Preq:* BIOL 104, 111, or consent of instructor.

BIOSC (GEN, MICRO) 418, 618 Biotechnology I: Nucleic Acids Techniques 4(2,4) Basic training in the manipulation of genetic information using recombinant DNA technology. Includes techniques in molecular cloning, Southern and Northern analyses, clone library construction. *Preq:* BIOCH 210 or 301, MICRO 305 or consent of instructor.

BIOSC 420, H420, 620 Neurobiology 3(3,0) Broad background in neurobiology. Topics include neuroanatomical structure-function; conduction in the neuron; neurite growth and development; neuromuscular junction; chemistry, physiology, and pharmacology of specific neurotransmitters and receptors; visual process; axoplasmic transport; hypothalamic-pituitary regulation; theories of behavior; theories of learning and memory. *Preq:* BIOCH 210 or 301 or consent of instructor.

BIOSC 425, 625 Introductory Mycology 3(3,0) Introduction to the biology of all the groups of fungi and some related organisms, with considerations of the taxonomy, morphology, development, physiology, and ecology of representative forms. *Preq:* BIOL 104 or 111 or BIOSC 205.

BIOSC 426, 626 Mycology Practicum 2(1,2) Application of the principles of mycological techniques, including isolation, culture, identification, and microscopic study of fungi. Examples from all major groups of fungi are included. *Preq or Coreq*: BIOSC 425.

BIOSC 432, H432, 632 Animal Histology 3(3,0) Structural and functional study of the basic tissues of animals and tissue makeup of organs. Emphasis is on light microscopy level with selected tissue studied at the electron microscope level. *Preq:* BIOSC 303 or consent of instructor. *Coreq:* BIOSC 433.

BIOSC 433, H433, 633 Animal Histology Laboratory 2(1,2) Microscopic examination of basic animal tissue types and the tissue makeup of organs which comprise systems. *Coreq:* BIOSC 432.

BIOSC 435, H435, 635 Principles of Evolution 4(4,0) Introduction to the fundamental principles and major concepts of the evolutionary process in animals, including a consideration of evolutionary theories, adaptive processes in populations, and major evolutionary patterns and to the principles of classification and systematics. *Preq:* GEN 302 or consent of instructor.

BIOSC 440, H440, 640 Developmental Animal Biology 3(3,0) Events and mechanisms responsible for the development of multicellular animals. Gametogenesis, fertilization, embryonic development, cellular differentiation, morphogenesis, larval forms and metamorphosis, asexual reproduction, regeneration, malignancy, and aging are analyzed in terms of fundamental concepts and control processes. *Preq:* BIOCH 210 or 301 or consent of instructor. *Coreq:* BIOSC 450.

BIOSC 441, H441, 641 Ecology 3(3,0) Study of basic ecological principles underlying the relationships between organisms and their biotic and abiotic environments. Includes physiological, population, and community ecology, with applications of each to human ecological concerns. *Preq:* BIOL 104, 111 or BIOSC 205 or consent of instructor.

BIOSC 442, H442, 642 Biogeography 3(3,0) Study of patterns of distribution of plants and animals in space and time. *Preq:* BIOSC 302 or 303 and 304 or 305 or consent of instructor.

BIOSC 443, 643 Aquatic Ecology 3(3,0) Study of basic ecological principles and concepts as they apply to aquatic environments: rivers and streams, lakes and ponds, reservoirs, swamps, marshes, estuaries, and marine systems. *Preq:* Junior standing in a life science or consent of instructor.

BIOSC 445, H445, 645 Ecology Laboratory 2(1,2) Modern and classical approaches to the study of ecological problems discussed in BIOSC 441. Students are introduced to field, laboratory and computer-based analyses of plant and animal populations and communities. *Preq or Coreq:* BIOSC 441.

BIOSC 446, H446, 646 Plant Ecology 3(3,0) Ecology of plants in relation to their biotic and abiotic environments. Individual organisms, populations, and communities are considered with an emphasis on seed plants in terrestrial environments. *Preq:* BIOL 104, 111 or BIOSC 205 or consent of instructor.

BIOSC 447, H447, 647 Plant Ecology Laboratory 2(1,2) Experimental and observational approach to addressing principles discussed in BIOSC 446. Students are introduced to field and laboratory methods involving individual organisms, populations, and communities. *Preq or Coreq:* BIOSC 446 or consent of instructor.

BIOSC 450, H450, 650 Developmental Biology Laboratory 2(1,2) Examines a broad range of topics concerned with the development of multi-cellular animals such as gametogenesis, fertilization, embryonic development, cell differentiation, morphogenesis, larval metamorphosis, and regeneration. Laboratory exercises provide the rationale and methods for the descriptive and experimental analysis of development in representative invertebrates and vertebrates. *Preq or Coreq:* BIOSC 440 or equivalent.

BIOSC 452, 652 Plant Anatomy and Morphology 3(3,0) Study of the anatomy, reproduction, and phylogenetic relationships of vascular plants. *Preq:* BIOL 104, 111 or BIOSC 205, or consent of instructor.

BIOSC 453, 653 Plant Anatomy and Morphology Laboratory 2(1,2) Laboratory focusing on the anatomy, reproduction, and phylogenetic relationships of vascular plants. *Coreq:* BIOSC 452.

BIOSC 456, H456, 656 Medical and Veterinary Parasitology 3(3,0) Introduction to parasitism in the animal kingdom; emphasizes basic and applied principles related to economically and medically important diseases. Classical and experimental approaches to the study of parasitism are examined in reference to protozoa, helminths, and arthropods. *Preq:* BIOL 104 or 111. *Coreq:* BIOSC 457.

BIOSC 457, H457, 657 Medical and Veterinary Parasitology Laboratory 2(1,2) Laboratory to reinforce material presented in BIOSC 456; introduce students to both live and preserved human/animal parasites. Students are also introduced to techniques used in collection, preservation, and examination of animal parasites. *Coreq:* BIOSC 456.

BIOSC 458, H458, 658 Cell Physiology 3(3,0) Study of the chemical and physical principles of cell function emphasizing bioenergetics and membrane phenomena. *Preq:* BIOCH 210 or 301 or consent of instructor.

BIOSC 459, H459, 659 Systems Physiology 3(3,0) Physiological systems of vertebrates and their homeostatic controls. Function of the major physiological systems is described in terms of anatomical structure and chemical and physical principles. *Preq:* One year each of biology, chemistry, and physics or consent of instructor.

BIOSC 460, 660 Systems Physiology Laboratory 2(1,2) Modern and classical experimental methods are used to demonstrate fundamental physiological principles discussed in BIOSC 459. Students are introduced to computer-aided data acquisition and computer simulations of physiological function. *Preq or Coreq:* BIOSC 459.

BIOSC 461, H461, 661 Cell Biology 3(3,0) In-depth analysis of how and where intracellular and extracellular molecules control general and specific cellular functions such as gene expression, secretion, motility, signaling, cell-cycle control and differentiation. Taught and graded at a level where students are expected to infer from and integrate cellular events. *Preq:* BIOCH 301 or consent of instructor.

BIOSC 462, 662 Cell Biology Laboratory 2(1,2) Accompanies BIOSC 461; focuses on molecular and microscopic analysis of eukaryotic cells. *Coreq:* BIOSC 461.

BIOSC 464, 664 Mammalogy 3(2,3) Origin, evolution, distribution, structure, and function of mammals, with laboratory emphasis on the mammals of South Carolina. Field collection required. *Preq:* BIOSC 303 or consent of instructor.

BIOSC (HORT) 465, 665 Plant Molecular Biology 3(3,0) Study of fundamental plant processes at both the cellular and molecular levels. Topics include genome structure and organization (both nuclear and organellar); regulation of gene expression and its role in cellular and whole-plant processes; transposable genetic elements; applications for biotechnology. *Preq:* Junior standing or consent of instructor; BIOSC 304 or 305; GEN 302.

BIOSC 468, 668 Herpetology 3(2,3) Systematics, life history, distribution, ecology, and current literature of amphibians and reptiles. Laboratory study of morphology and identification of world families, and U.S. genera, as well as all southeastern species. Field trips are required. *Preq:* BIOSC 303 or consent of instructor.

BIOSC 470, H470, 670 Animal Behavior 3(3,0) Historical and modern developments in animal behavior emphasizing the evolutionary and ecological determinants of behavior. A synthesis of ethology and comparative psychology. *Preq:* BIOSC 302 or 303 or consent of instructor.

BIOSC 471, 671 Animal Behavior Laboratory 1(0,3) Laboratory exercises that explore the behavior of animals. Emphasis is on behavioral observation and analysis and presentation of findings in a report format. *Preq or Coreq:* BIOSC 470 or consent of instructor.

BIOSC 472, 672 Ornithology 4(3,3) Biology of birds: their origin and diversification, adaptations, phylogeny, classification, structure and function, behavior, ecology, and biogeography. Field identification is emphasized, and field trips are required. *Preq:* BIOSC 303 or consent of instructor.

BIOSC 475, H475, 675 Comparative Physiology 3(3,0) Physiological systems of invertebrates and vertebrates with emphasis on environmental adaptation. Physiological principles as they relate to metabolism, thermoregulation, osmoregulation, respiration, and neural and integrative physiology. *Preq:* One year each of biology, chemistry, and physics or consent of instructor.

BIOSC 476, H476, 676 Comparative Physiology Laboratory 2(1,2) Modern classical experimental methods are used to demonstrate fundamental physiological principles discussed in BIOSC 475. Students are introduced to computer-aided data acquisition and manipulation as well as computer simulations of physiological function. *Preq or Coreq:* BIOSC 475.

BIOSC 477, 677 Ichthyology 3(2,3) Systematics, life history, distribution, ecology, and current literature of fish. Laboratory study of morphology and identification of U.S. genera, as well as all southeastern species. Field trips are required. *Preq:* BIOSC 303 or consent of instructor.

BIOSC 480, 680 Vertebrate Endocrinology 3(3,0) Introduction to the basic principles of neuro-endocrine integration and homeostatic maintenance in vertebrates. Comparative morphology and physiology of various endocrine tissues and hormone chemistry and modes of action are considered. *Preq:* BIOSC 303, organic chemistry, or consent of instructor.

BIOSC 486 Natural History 3(3,0) Interdisciplinary examination, through readings and critical discussion, of concepts of nature and biodiversity in relation to human endeavors. Course seeks to achieve a balanced perspective from which to seek compromises between conflicting views of nature. *Preq:* BIOSC 441, 443, or 446, or equivalent, or consent of instructor.

BIOSC 491, H491 Special Problems in Biological Sciences 2-4(0,6-12) Research problems in selected areas of biological sciences to provide an introduction to research planning and techniques. May be taken for a maximum of eight credits. *Preq:* Junior or Senior standing or consent of instructor.

BIOSC 493 Senior Seminar 2(2,0) Analysis and discussion of papers from the primary literature of the biological sciences. Students search the primary literature, present and analyze selected readings. *Preq:* Senior standing and either ENGL 314 or SPCH 250 or consent of instructor.

BIOLOGY

Professors: J. L. Dickey, D. R. Helms, R. J. Kosinski, W. M. Surver, *Chair*; *Associate Professors:* R. A. Garcia, C. K. Revis-Wagner, A. D. Smith, J. A. Waldvogel; *Assistant Professor:* M. V. Ruppert; *Lecturers:* J. R. Cummings, V. C. Minor

BIOL 101 Concepts in Biology I 4(3,3) First in a two-semester general education sequence covering fundamental biological concepts. Emphasizes the process of scientific inquiry applied to evolution, cell structure and function, genetics, and metabolism. Develops biological literacy by applying concepts to important issues in everyday life. Not open to students who have received credit for BIOL 110/111 or BIOL 103/104.

BIOL 102 Concepts in Biology II 4(3,3) Continuation of BIOL 101, emphasizing the process of scientific inquiry applied to biodiversity, animal and plant structure and function, ecology, and human impact on the environment. Develops practical biological literacy by applying concepts to important issues in everyday life. Not open to students who have received credit for BIOL 110/111 or BIOL 103/104. *Preq:* BIOL 101.

BIOL 103, H103 General Biology I 4(3,3) First in a two-semester sequence on the fundamentals of biology. Lecture and laboratory emphasize the structural, molecular, and energetic basis of cellular activities, fundamentals of genetic variability, reproductive strategies of organisms, and scientific processes. Diversity of animals and principles of evolution are introduced. Credit toward a degree will be given for only one of the following combinations: BIOL 110/111 or 103/104, dependent on the requirements for the major.

BIOL 104, H104 General Biology II 4(3,3) Continuation of BIOL 103, emphasizing animals and plants as functional units, evolution and diversity of plants, and principles of evolution and ecology. Credit toward a degree will be given for only one of the following combinations: BIOL 110/111 or 103/104, dependent on the requirements for the major. *Preq:* BIOL 103.

BIOL 109 Introduction to Life Science 4(3,3) Survey of topics in botany, zoology, microbiology, and ecology emphasizing comprehension and practical application of life-science concepts to experiments and activities for the elementary school classroom. Enrollment priority will be given to Early Childhood and Elementary Education majors.

BIOL 110, H110 Principles of Biology I 5(4,3) Introductory course designed for students majoring in biological disciplines. Integrates lecture and laboratory and emphasizes a modern, quantitative, and experimental approach to explanations of structure, composition, dynamics, interactions, and evolution of cells and organisms. High school chemistry is recommended. Credit toward a degree will be given for only one of the following combinations: BIOL 110/111 or 103/104, dependent on the requirements for the major. *Coreq:* CH 101.

BIOL 111, H111 Principles of Biology II 5(4,3) Continuation of BIOL 110; emphasizes the study of plants and animals as functional organisms and the principles of ecology. Credit toward a degree will be given for only one of the following combinations: BIOL 110/111 or 103/104, dependent on the requirements for the major. *Preq:* BIOL 110.

BIOSYSTEMS ENGINEERING

Professors: W. H. Allen, D. E. Brune, J. A. Collier, R. B. Dodd, Y. J. Han, J. C. Hayes, *Chair*; D. E. Linvill, R. E. Williamson; *Assistant Professors:* T. O. Owino, M. A. Schlautman; *Instructor:* T. R. Garrett

B E 214 Fabrication and Manufacturing Methods 2(1,3) Introduction to machine and structure fabrication for biosystems. Topics include metallurgy, arc and gas welding, fasteners, plastics, and protective coatings. *Preq:* E M 201. *Coreq:* E G 209.

B E 221 Surveying for Soil and Water Resources 2(1,3) Fundamentals of land measurement and traverse computations. Surveying practice in traverse and topographic surveys preliminary to design of techniques and construction of structures for resource management. *Preq:* MTHSC 106.

B E 322 Small Watershed Hydrology and Sedimentology 3(3,0) [W.1] Fundamental relationships governing rainfall disposition are used as bases for defining the hydrology of watersheds. Application of modeling techniques appropriate for runoff and sediment control is emphasized. *Preq:* PHYS 122. *Coreq:* CSENV 202.

B E 333 Environmental Modification 2(2,0) Principles of environmental modification and control including energy exchange, psychrometrics, heat and moisture balance, biological interactions, control systems, and basic elements of heating, ventilation, and air conditioning. *Preq:* PHYS 221; M E 310 or consent of instructor.

B E 350, H350 Microcomputer Controls in Biosystems 2(1,3) Microcomputer interfacing and digital control are studied for application to agriculture, aquaculture, biotechnology, and other biosystems. Topics include digital electronic circuits and components, microcomputer architecture and interfacing. *Preq:* E C E 307, MTHSC 208.

B E 357 Machine Unit Operations 2(2,0) Unit operations of machines useful to biosystems engineers are studied from a functional and applications approach. Machine cost analysis is included. *Preq:* B E 214 and E M 201 or consent of instructor.

B E 362, H362 Energy Conversion for Biosystems 3(2,3) Topics include energy requirements of biosystems, direct energy conversion methods, characteristics of energy sources, and economics. Energy conversion methods used in biosystems and their limitations are presented. *Preq:* M E 310.

B E 364 Non-Point Source Pollution Management and Control 3(2,3) Fundamentals of environmental engineering; includes quantification of environmental impact and ecosystem management related to non-point source environmental contaminants and nutrients and planning and design of waste management systems. *Preq:* One year of chemistry, junior standing or consent of instructor.

B E 370 Practicum 1-3 Preplanned internship with an approved employer involved with biosystems engineering endeavors. A minimum 130 hours of supervised responsibility is required per credit hour. Evaluation is based on activity journal, written/oral report, and an evaluation from the supervisor. May be repeated for a maximum of three credits. To be taken Pass/Fail only. *Preq:* Junior standing and departmental permission.

B E (CSENV) 408, 608 Land Treatment of Wastewater and Sludges 3(3,0) See CSENV 408.

B E 416, H416, 616 Biosystems Engineering Capstone Design 3(2,3) Fundamentals of mechanical design with applications to biosystems, biomaterials, and bioproducts. Approved design project is required. *Preq:* All required 300-level engineering courses except I E 384 and B E 364.

B E 421 Engineering Systems for Soil Water Management 2(1,3) Fundamentals of design related to drainage of lands, irrigation, and modification of the microenvironment for optimum productivity are presented. *Preq:* MTHSC 208. *Coreq:* C E 341.

B E (CH E) 428, 628 Biochemical Engineering 3(3,0) Use of microorganisms and enzymes for the production of chemical feedstocks, single-cell protein, antibiotics, and other fermentation products. Topics include kinetics and energetics of microbial metabolism, design and analysis of reactors for microbial growth and enzyme-catalyzed reactions, and considerations of scale-up, mass transfer, and sterilization during reactor design. *Preq:* B E 430, BIOCH 301, MICRO 305 (for Biosystems Engineering majors); *Coreq:* CH E 312, 450 (for Chemical Engineering majors).

B E 430, 630 Problem Solving Methods and Models in Biosystems Engineering 3(3,0) Fundamentals of mathematical and computer modeling of physical, chemical, and biological phenomena applied to biosystems engineering. Topics include the modeling process, problem solving methods, numerical techniques, estimating model coefficients, validation, and classic models used in biosystems, biomedical, environmental and agricultural engineering. *Preq:* BIOCH 301 or 210 or consent of instructor. *Coreq:* M E 310 or instruction in thermodynamics.

B E 431, 631 Structural Design for Biosystems 2(2,0) Analysis and design of structures and statically determinant components with emphasis on wood. *Preq:* E M 304 or C E 200.

B E 435 Applications in Biotechnology Engineering 3(2,3) Bioengineering principles applied to the expanding fields of agricultural biotechnology, ecotechnology, and biomedical technology. Specific applications include waste treatment and ecological engineering, bioreactor propagation of plant and animal cells and tissues, applied genomics and synthetic seed production, biosensors and biomonitoring, biological implants and materials biocompatibility. *Preq:* B E (CH E) 428.

B E 442, 642 Properties and Processing of Biological Products 2(1,3) Study of engineering properties of biological materials and their uniqueness as design restraints on systems for handling, processing and preserving biological products. *Preq:* B E 333, C E 341, E M 304, M E 310.

B E 450, H450, 650 Instrumentation for Biosystems Engineers 3(2,3) [C.1] Overview of modern instrumentation techniques for biosystems. Laboratory use of equipment is emphasized. Topics include performance characteristics of instruments, analog-signal conditioning, transducer theory and applications, and digital systems for data acquisition and control. *Preq:* B E 350, familiarity with computer programming, or consent of instructor.

B E (EE&S, FOR) 451, H451, 651 Newman Seminar and Lecture Series in Natural Resources Engineering 1(0,2) Topics dealing with development and protection of land, air, water, and related resources are covered by seminar with instructor and invited lecturers. Current environmental and/or resource conservation issues are addressed. *Preq:* Senior standing, consent of instructor.

B E 471 Engineering Research and Management 2(1,3) [W.1] Research project is conducted on a biosystems engineering problem. Engineering economics, engineering creativity, and project management are incorporated in addition to communication skills. *Preq:* Senior standing in an engineering curriculum.

B E 473 Special Topics in Biosystems Engineering 1-3(1-3,0) Comprehensive study of special topics not covered in other courses. Emphasis is on independent pursuit of detailed investigations. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Senior standing and consent of department.

B E (EE&S, I E) 484, 684 Municipal Solid Waste Management 3(3,0) See EE&S 484.

BUSINESS

BUS 101 Business Foundations 1(1,0) Overview of the business environment. Topics include the economic and legal foundations of business and an introduction to the human resources, marketing, operations, and financial functions of global businesses. To be taken Pass/Fail only.

CALHOUN HONORS SEMINAR

The following courses may be taken to satisfy Accreditation Board for Engineering and Technology (ABET) requirements for depth in humanities and social sciences by pairing or sequencing with humanities or social science subject areas as designated in the syllabus for each Calhoun Honors Seminar course offering.

C H S H201 Structures and Society 3(3,0) Interdisciplinary honors seminar that examines selected structures regarded as monuments to artistic creativity and technological genius and the ways that structures affect and are affected by the societies that produce them. *Preq:* Membership in Calhoun Honors College Program.

C H S H202 Science, Culture, and Human Values 3(3,0) Interdisciplinary honors seminar that unifies natural scientific, social scientific, and humanistic disciplines into a holistic view of the modern world and its future. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Membership in Calhoun Honors College Program.

C H S H203 Society, Art, and Humanities 3(3,0) Combines readings and methodologies from the social sciences, arts, and humanities to study the interrelationships among the disciplines and their societal effects. Subjects vary. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Membership in Calhoun Honors College Program.

C H S H204 Honors Study/Travel 1(0,3) Study/travel experience related to a three credit Calhoun Honors Seminar. May be repeated for a maximum of three credits, but only if different topics are covered. *Preq:* Membership in Calhoun Honors College Program.

C H S H205 Methods of Interpretation 1(1,0) Seminar to teach students how to interpret documents, works of art, structures, and scholarly materials related to a three credit Calhoun Honors Seminar. May be repeated for a maximum of three credits, but only if different topics are covered. *Preq:* Membership in Calhoun Honors College Program.

CERAMIC AND MATERIALS ENGINEERING

Professors: D. A. Brosnan, D. R. Dinger, H. J. Rack, *Chair; Associate Professors:* B. I. Lee, H. D. Leigh III; R. W. Schwartz, E. C. Skaar, T. D. Taylor; *Assistant Professor:* J. M. Ballato

C M E 210 Introduction to Materials Science 3(3,0) Beginning course in materials science designed primarily for engineering students. Study of the relation between the electrical, mechanical, and thermal properties of products and the structure and composition of these products. All levels of structure are considered from gross structures easily visible to the eye through electronic structure of atoms. *Preq:* CH 102, MTHSC 108.

C M E 221 Materials Processing I 3(3,0) Introduction into the principles underlying the processing/manufacturing of ceramic, polymeric, and metallic materials. Co*req:* C M E 225.

C M E 222 Materials Processing II 3(3,0) Continuation of C M E 221 describing the principles underlying the processing/manufacturing of ceramic, polymeric, and metallic materials. *Preq:* C M E 221; Co*req:* C M E 242.

C M E 225 Structure of Materials 3(3,0) Introductory course in fundamentals of atomic bonding as it relates to crystal structure and the resulting properties of metals, ceramics, and polymers. Emphasis is placed on the influence of crystallography and microstructure on the physical and chemical performance of materials. *Preq:* CH 102, PHYS 122, MTHSC 108.

C M E 226 Thermodynamics of Materials 3(3,0) Introduction to physical laws that govern the equilibrium products of chemical and thermal reactions. Covers the three laws of thermodynamics, phase equilibria, energy requirements for reactions, material corrosion, and environmental stability. *Preq:* CH 102, MTHSC 108; *Coreq:* PHYS 221.

C M E 227 Transport Phenomena 3(3,0) Kinetic aspects of mass, heat, and fluid transport as they relate to the processing and performance of materials. *Preq:* C M E 226; *Coreq:* MTHSC 208.

C M E 228 Phase Diagrams for Materials Processing and Applications 3(3,0) Teaches students to use single component, binary, and ternary phase diagrams to analyze material processing routes and utilization. Reaction pathways by which material microstructure evolves and the relationship of reaction pathway to equilibrium phase diagrams are considered, as are material interactions/degradation during use. *Preq:* C M E 226.

C M E 241 Metrics Laboratory 1(0,3) Provides basic knowledge of statistical techniques and testing procedures used to evaluate materials. Sampling procedures, calculation of averages, confidence intervals, Weibull statistics, precision and accuracy to enable quality decision making are included. *Coreq:* C M E 221.

C M E 242 Fabrication and Microscopy Laboratory 2(0,6) [O.1] Laboratory demonstrating how useful engineering products and components may be fabricated. Statistical experimental design and ANOVA are introduced to evaluate the effects of processing inputs on material properties. Sampling and sample preparation methods and optical microscopy analysis are presented. *Preq:* C M E 225, 241; *Coreq:* C M E 222.

C M E H300 Honors Seminar 1(1,0) Acquaints students enrolled in the Departmental Honors Program with current research issues in the profession. This assists students in preparing a research proposal for the Senior Thesis. To be taken Pass/Fail only. *Preq:* Junior standing, admission to departmental honors program.

C M E 303 Noncrystalline Materials 3(3,0) Basic course on the fundamentals of the noncrystalline state. Topics include cooling kinetics and effects on formation, as well as physical properties of noncrystalline substances, in metallic, polymeric, and ceramic systems. *Preq:* C M E 228, 320.

C M E 304 Experimental Design 3(1,4) [C.1] Junior-level laboratory course which exposes students to statistically-designed experimental techniques to solve ceramic engineering problems typically encountered in processing, testing, and manufacturing ceramic materials. *Preq:* C M E 221, 225.

C M E 320 Mechanical Behavior of Materials 3(3,0) Covers the microstructural basis of deformation and fracture in ceramic, metallic, and polymeric systems. *Preq:* MTHSC 208, C M E 225.

C M E 321 Characterization of Materials 3(3,0) Provides students with an overview of the commonly used materials characterization techniques, including x-ray diffraction, thermal analysis, microscopy, and surface analysis. *Preq:* C M E 225; *Coreq:* C M E 341.

C M E 322 Thermal Processing of Materials 3(3,0) Description and analysis of thermal processing steps. Treatment using the fundamental science of processes and the engineering of commercial scale equipment. Particular emphasis is placed on sintering, nucleation and growth, stress relief. Thermal analysis and phase transformation processes are also discussed. *Preq:* C M E 227, 228; *Coreq:* C M E 341.

C M E 323 Combustion Systems and Environmental Emissions 3(3,0) Study of the application of burners, burner controls, firing atmospheres, hydrocarbon fuels, and other energy resources to industrial kilns, furnaces, and firing operations. Topics include energy resources, fuel chemistry, combustion analysis, ratio control systems, flow and pressure measurement and control, kiln atmosphere controls, industrial burners, and flames. *Preq:* C M E 226, 322.

C M E 330 Powder Processing 3(3,0) Study of the cause-and-effect relationship in particulate suspensions controlling rheological behavior, porosity, packing densities, shrinkages, and other properties in powder systems. Topics include particle size analysis techniques and measurements, particle packing, rheological properties and measurements, surface area analysis, and interfacial chemicals including both flocculants and deflocculants. *Preq:* C M E 227; *Coreq:* C M E 342.

C M E 341 Analytical Methods and Phase Development 2(0,6) [O.1] Students learn how to use analytical tools such as XRD, thermal analysis, SEM and EDAX to characterize materials, evaluate processing effects, and determine failure modes. Provides understanding of how thermodynamics and kinetics affect the development of phases in materials. *Preq:* C M E 242; *Coreq:* C M E 321.

C M E 342 Structure/Property Laboratory 2(0,6) [W.1] Provides a basic understanding of how microstructure interrelationships and processes affect the physical properties of materials and how environmental effects modify structure and mechanical behavior of materials. *Preq:* C M E 341, 320.

C M E 361 Processing of Metals and Their Composites 3(3,0) Examines the control of microstructure-property relationships in metallic materials and their composites through development and selection of innovative manufacturing methods. *Preq:* C M E 222, 227, 320.

C M E H395 Honors Research I 3(0,9) Individual research under the direction of a Ceramic and Materials Engineering faculty member. *Preq:* C M E 222, 227, 228.

C M E 402, 602 Solid State Materials 3(3,0) Discussion of the properties of solids as related to structure and bonding with emphasis on electronic materials. Band structure theory, electronic, and optical properties are treated. *Preq:* C M E 225, PHYS 221, MTHSC 208.

C M E 407 Senior Capstone Design 3(1,6) [C.1, O.1, W.1] Work with industrial partners who have materials related processes or product problems. Emphasizes interdisciplinary team approach and global perspective of products and problems. Critical thinking, group effectiveness and problem solving with materials and processes. Collaborative efforts between industry and student academic teams are employed. *Preq:* C M E 441, I E 384.

C M E 416, 616 Electronic Ceramics 3(3,0) Theory and measurement of the electronic properties of ceramic products.

C M E 418, 618 Process Control 3(3,0) Process control techniques and apparatus with particular emphasis on temperature measurement and control systems. Application of laboratory techniques to the control of product quality and process efficiency is included. *Preq:* C M E 303, 330, 461.

C M E 424, 624 Optical Materials and Their Applications 3(3,0) Introduces the interaction of materials with light. Specific topics include fundamental optical properties, materials synthesis, optical fiber and planar waveguides, and the componentry and systems-level aspects of optical communication systems. *Preq:* C M E 303, 402.

C M E 425, 625 Micromechanical Behavior of Materials 3(3,0) Considers advanced concepts of microstructure-deformation-fracture interrelationships in engineering materials. *Preq:* C M E 320, 343.

C M E 431, 631 Advanced Ceramic Processing 3(3,0) Provides advanced study of ceramic forming processes. Focus is on the many types of ceramic forming processes, such as slip casting, extrusion, dry pressing, filter pressing, and plastic forming. *Preq:* C M E 330.

C M E 432 Manufacturing Processes and Systems 3(3,0) Plant layout and design for manufacturing of ceramic products. Emphasizes process control and verification of processing results. Adaptation of computers in process simulation/robotics. Use of programmable logic controllers and robotics in processing. *Preq:* C M E 418, 431.

C M E 441 Manufacturing Laboratory 1(0,3) [W.1] Provides students with the understanding of process optimization. Use of complex experimental design schemes to elucidate the interrelationships between processing, microstructural development, and resulting properties is emphasized. *Preq:* C M E 344; *Coreq:* C M E 418.

C M E 460, 660 Metals and Their Composites 3(3,0) Examines the control of microstructure-property relationships in metallic materials and their composites through development and selection of appropriate thermal processing procedures. *Preq:* C M E 322, 342.

C M E (BIO E) 480, 680 Research Principles and Concepts 1(1,0) See BIO E 480.

C M E 490, H490, 690 Special Topics in Ceramic Engineering 1-3(1-3,0) Study of topics not ordinarily covered by other courses. Taught as the need arises. Typical topics could include current research in a specific area or technological advances. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

C M E H495 Honors Research II 3(0,9) Individual research under the direction of a Ceramic and Materials Engineering faculty member. *Preq:* C M E H395.

C M E H497 Honors Thesis 1(1,0) Preparation of honors thesis based on research conducted in C M E H395 and H495. *Preq:* C M E H495.

CHEMICAL ENGINEERING

Professors: C. H. Barron, Jr., D. D. Edie, C. H. Gooding, J. G. Goodwin, Jr., *Chair;* J. M. Haile, S. S. Melsheimer, A. A. Ogale, M. C. Thies; *Associate Professors:* D. E. Hirt, R. W. Rice; *Assistant Professors:* D. A. Bruce, G. M. Harrison, S. M. Husson, S. M. Kilbey II

CH E 211 Introduction to Chemical Engineering 4(3,2) Introduction to fundamental concepts of chemical engineering, including mass and energy balances, PVT relationships for gases and vapors, and elementary phase equilibria; problem-solving and computer skills are developed in lab. *Preq:* CH 102, ENGR 120, PHYS 122.

CH E 220 Chemical Engineering Thermodynamics I 3(3,0) Topics include first and second laws of thermodynamics, ideal gases, PVT properties of real fluids, energy balances with chemical reactions, and thermodynamic properties of real fluids. *Preq:* CH E 211, MTHSC 206.

CH E H300 Honors Seminar 1(1,0) Acquaints students enrolled in the Departmental Honors Program with current research issues in the profession. This assists the student in preparing a research proposal for the Senior Thesis. To be taken Pass/Fail only. *Preq:* Admission to departmental honors program, Junior standing.

CH E 307 Unit Operations Laboratory I 3(2,3) [O.1] [W.1] Laboratory work in the unit operations of fluid flow, heat transfer, and evaporation. Stress is on the relation between theory and experimental results and the statistical interpretation of those results and on report preparation and presentation. *Preq:* CH E 311, E G 209. *Coreq:* EX ST 411 or MTHSC 302.

CH E 311 Fluid Flow 3(3,0) Fundamentals of fluid flow and the application of theory to chemical engineering unit operations, such as pumps, compressors, and fluidization. *Preq:* CH E 211, MTHSC 206.

CH E 312 Heat and Mass Transfer 3(3,0) Study of the basics of heat transmission and mass transport. Special emphasis is placed on theory and its application to design. *Preq:* CH E 220, 311.

CH E 319 Engineering Materials 3(3,0) Introduction to the fundamental properties and behavior of engineering materials, with emphasis on polymers, metals, ceramics, and composite materials. *Preq:* CH E 211. *Coreq:* CH 223, CH E 220.

CH E 321 Chemical Engineering Thermodynamics II 3(3,0) Continuation of CH E 220. Topics include thermodynamics of power cycles and refrigeration/liquefaction, thermodynamic properties of homogeneous mixtures, phase equilibria, and chemical reaction equilibria. *Preq:* CH E 220, MTHSC 208.

CH E 353 Process Dynamics and Control 3(3,0) Mathematical analysis of the dynamic response of process systems. Basic automatic control theory and design of control systems for process applications. *Preq:* CH E 311, MTHSC 208.

CH E H395 Honors Research I 3(0,9) Individual research under the direction of a Chemical Engineering faculty member. *Preq:* CH E H300 or permission of department honors coordinator.

CH E 401, 601 Transport Phenomena 3(3,0)S Mathematical analysis of single and multi-dimensional steady-state and transient problems in momentum, energy, and mass transfer. Both the similarities and differences in these mechanisms are stressed. *Preq:* CH E 312, MTHSC 208.

CH E 407 Unit Operations Laboratory II 3(1,6)F [O.1, W.1] Continuation of CH E 307 with experiments primarily on the diffusional operations. Additional lecture material on report writing and general techniques for experimental measurements and analysis of data, including statistical design of experiments. *Preq:* CH E 307, 312, 353.

CH E 412, 612 Polymer Engineering 3(3,0) Design-oriented course in synthetic polymers. Topics include reactor design used in polymer production, effect of step versus addition kinetics on reactor design, epoxy curing reactions, polymer solubility, influence of polymerization and processing conditions on polymer crystallinity. *Preq:* CH 224 and 332 or consent of instructor.

CH E 413 Separation Processes 3(3,0) [C.1] Study of gas-liquid and liquid-liquid separation techniques with emphasis on gas absorption, distillation, and liquid-liquid extraction. *Preq:* CH 332, CH E 312, 321.

CH E (B E) 428, 628 Biochemical Engineering 3(3,0) See B E 428.

CH E 431 Process Development, Design, and Optimization of Chemical Engineering Systems I 3(2,3) Steps in creating a chemical process design from original concept to successful completion and operation of the plant. Topics include engineering economics, systems and analysis, simulation, optimization, process-equipment sizing, selection, and costing. *Preq:* CH E 307, 312. *Coreq:* CH E 413.

CH E 432 Process Development, Design, and Optimization of Chemical Engineering Systems II 5(1,12) [O.1, W.1] Continuation of CH E 431. Principles of process development, design, and optimization are applied in a comprehensive problem carried from a general statement of the problem to detailed design and economic evaluations. *Preq:* CH E 321, 353, 407, 413, and 450 or consent of department chair.

CH E 443 Chemical Engineering Senior Seminar I 1(1,0) Preparation of senior chemical engineering students for entry into the profession. Timely information on job interviewing skills, career placement and guidance, professional registration, professional behavior and ethics, and management of personal finances. Outside speakers are used frequently. To be taken Pass/Fail only. *Preq:* CH E 312, Senior standing in Chemical Engineering. *Coreq:* CH E 431.

CH E 444 Chemical Engineering Senior Seminar II 1(1,0) [O.1] Working in groups, students present and discuss topics related to professional practice, ethics, business, industrial safety, the environment, and selected technical subjects of interest to society. *Preq:* CH E 443, senior standing in Chemical Engineering. *Coreq:* CH E 432.

CH E 445 Selected Topics in Chemical Engineering 3(3,0) Topics not covered in other courses, emphasizing current literature, research, and practice of chemical engineering. Topics vary from year to year. May be repeated, but only if different topics are covered. *Preq:* Consent of instructor.

CH E 450, 650 Chemical Reaction Engineering 3(3,0)F Review of kinetics of chemical reactions and an introduction to the analysis and design of chemical reactors. Topics include homogeneous and heterogeneous reactions, batch and continuous flow reaction systems, catalysis, and design of industrial reactors. *Preq:* CH E 312, 321, CH 332.

CH E 454, 654 Computer Process Control 3(3,0) Introduction to digital computer control as applied in chemical process industries. Topics include dynamics of process systems, control computer hardware and software, sampled data mathematics, digital control algorithms, process identification, and advanced control techniques. *Preq:* CH E 353 or equivalent, E C E 307, MTHSC 208.

CH E 491, H491 Special Projects in Chemical Engineering 1-3(1-3,0) Topics requested by students or offered by faculty as the need arises. Topics may include review of current research in an area, technological advances, and national engineering goals. May be repeated for a maximum of six credits, but only if different topics are covered.

CH E H495 Honors Research II 3(0,9) Individual research under the direction of a chemical engineering faculty member. *Preq:* CH E H395.

CH E H497 Honors Thesis 1(1,0) Preparation of honors thesis based on research conducted in CH E H395 and H495. *Preq:* CH E H495.

CHEMISTRY

Professors: R. A. Abramovitch, A. L. Beyerlein, *Chair*; M. M. Cooper, S. E. Creager, D. D. DesMarteau, R. K. Dieter, I. D. Eubanks, J. W. Huffman, S.-J. Hwu, J. W. Kolis, R. K. Marcus, Y.-P. Sun; *Associate Professors:* J. R. Appling, A. L. Kholodenko, W. T. Pennington; *Assistant Professors:* D. P. Arya, G. D. Chumanov, D. Perahia, D. W. Smith, Jr., S. J. Stuart; *Lecturers:* K. A. Creager, D. J. Crockett, L. T. Eubanks, J. G. Kaup, A. Kitaygorodskiy, M. Krawiec; *Visiting Assistant Professors:* M. L. Doerr, L. Dosen-Micovic, K. W. Rillings; *Visiting Instructor:* E. L. Case

CH 101, H101 General Chemistry 4(3,3) Introduction to the elementary concepts of chemistry through classroom and laboratory experience. Emphasizes chemical reactions and the use of symbolic representation, the mole concept and its applications and molecular structure. Credit toward a degree will be given for only one of CH 101 and 105. *Preq or Coreq:* MTHSC 105 or higher placement in MTHSC.

CH 102, H102 General Chemistry 4(3,3) Continuation of CH 101, treating solutions, rates of reactions, chemical equilibrium, electrochemistry, chemistry of selected elements, and an introduction to organic chemistry. For students taking one year of chemistry or continuing in CH 201. Credit toward a degree will be given for only one of CH 102 or 106. *Preq:* C or better in CH 101.

CH 105 Beginning General and Organic Chemistry 4(3,3) Elementary treatment of principles of general and organic chemistry for students in liberal arts, education, business, health science, and selected life-science curricula. Laboratory is coordinated with lecture. May not be taken as a prerequisite for organic chemistry. Credit toward a degree given for only one of CH 101 or 105.

CH 106 Beginning General and Organic Chemistry 4(3,3) Continuation of CH 105. Topics in elementary organic chemistry with an emphasis on organic chemistry relevant to life processes are developed in both lecture and laboratory. May not be taken as a prerequisite for organic chemistry. Credit toward a degree will be given for only one of CH 102 or 106. *Preq:* C or better in CH 105 or consent of instructor.

CH 141 Chemistry Orientation 1(1,0) Lectures, discussions, and demonstrations devoted to health and safety in chemistry laboratories; use of the chemical literature; and career planning. *Preq:* Registration in CH 101.

CH 201 Survey of Organic Chemistry 4(3,3) Introduction to organic chemistry emphasizing nomenclature, classes of organic compounds, and chemistry of functional groups; for students needing one-semester course in organic chemistry. Credit toward a degree will be given for only one of CH 201 or 223. *Preq:* CH 102 or consent of instructor.

CH 205 Introduction to Inorganic Chemistry 2(2,0) One semester treatment which emphasizes the properties and reactions of the more common chemical elements. *Preq/Coreq:* CH 102.

CH 206 Inorganic Chemistry Laboratory 1(0,3) Introduction to laboratory synthesis and characterization of inorganic compounds. Laboratory sessions consist of a set of six landmark inorganic experiments for which the original authors have been awarded Nobel prizes. *Coreq:* CH 102, 205.

CH 223 Organic Chemistry 3(3,0) Introductory course in the principles of organic chemistry and the derivation of these principles from a study of the properties, preparations, and interrelationships of the important classes of organic compounds. Credit toward a degree will be given for only one of CH 201 or 223. *Preq:* CH 102 or consent of instructor.

CH 224 Organic Chemistry 3(3,0) Continuation of CH 223. *Preq:* CH 223.

CH 225 Organic Chemistry Laboratory 2(0,6) Laboratory techniques involved in the synthesis, separation and purification, and characterization of typical examples of the classes of organic compounds. Credit toward a degree will be given for only one of CH 225, 227, or 229. *Preq:* Registration in CH 223.

CH 226 Organic Chemistry Laboratory 2(0,6) Continuation of CH 225. Credit toward a degree will be given for only one of CH 226 or 228. *Preq:* Registration in CH 224.

CH 227 Organic Chemistry Laboratory 1(0,3) Synthesis and properties of typical examples of the classes of organic compounds. Credit toward a degree will be given for only one of CH 225, 227, or 229. *Preq:* Registration in CH 223.

CH 228 Organic Chemistry Laboratory 1(0,3) Continuation of CH 227. Credit toward a degree will be given for only one of CH 226 or 228. *Preq:* CH 227 and registration in CH 224.

CH 229 Organic Chemistry Laboratory 1(0,3) One-semester laboratory for chemical engineering students. Credit toward a degree will be given for only one of CH 225, 227, or 229. *Preq:* CH 223.

CH 313 Quantitative Analysis 3(3,0) Fundamental principles of volumetric, gravimetric, and certain elementary instrumental chemical analyses. *Preq:* Concurrent enrollment for credit in CH 315 or 317.

CH 315 Quantitative Analysis Laboratory 2(0,6) Laboratory techniques of volumetric, gravimetric, and elementary instrumental chemical analyses. Credit toward a degree will be given for only one of CH 315 or 317. *Coreq:* Concurrent enrollment for credit in CH 313.

CH 317 Quantitative Analysis Laboratory 1(0,3) Standard techniques of analytical chemistry—gravimetric, volumetric, and instrumental. Credit toward a degree will be given for only one of CH 315 or 317. *Coreq:* Concurrent enrollment for credit in CH 313.

CH 330 Introduction to Physical Chemistry 3(3,0) One-semester treatment of physical chemistry, emphasizing topics that are especially useful in the life sciences, agriculture, and medicine: chemical thermodynamics, equilibrium, solutions, kinetics, electrochemistry, macromolecules, and surface phenomena. Credit toward a degree will be given for only one of CH 330 or 331. *Preq:* MTHSC 106.

CH 331 Physical Chemistry 3(3,0) Includes the gaseous state, thermodynamics, chemical equilibria, and atomic and molecular structure, from both experimental and theoretical points of view. Credit toward a degree will be given for only one of CH 330 or 331. *Preq:* MTHSC 206, PHYS 221.

CH 332, H332 Physical Chemistry 3(3,0) Continuation of CH 331, including chemical kinetics, liquid and solid state, phase equilibria, solutions, electrochemistry and surfaces. *Preq:* CH 331 or consent of instructor.

CH 339 Physical Chemistry Laboratory 1(0,3) Experiments are selected to be of maximum value to Chemistry and Chemical Engineering majors. *Coreq:* CH 331 or CH E 220.

CH 340 Physical Chemistry Laboratory 1(0,3) Continuation of CH 339. *Preq:* Registration in CH 332.

CH 402, H402, 602 Inorganic Chemistry 3(3,0) Basic principles of inorganic chemistry are discussed with special emphasis on atomic structure, chemical bonding, solid state, coordination chemistry, organometallic chemistry, and acid-base theories. The chemistry of certain selected elements is treated. *Preq:* CH 331, 332.

CH 411 Instrumental Analysis 3(3,0) Principles of operation and application of modern chemical instrumentation in the field of analytical chemistry. Topics include basic electronics, statistics, optical, mass, magnetic resonance, electron and x-ray spectroscopies, radiochemistry, and separation science. *Preq:* CH 331, 332.

CH 412 Instrumental Analysis Laboratory 2(0,5) Reinforcement of principles of chemical instrumentation described in CH 411 by practical, hands-on experience. Aspects of sample preparation, standardization, data acquisition and interpretation, and report formulation procedures common in chemical analyses are considered for a range of modern instrumental methods. *Coreq:* CH 411.

CH 413, H413 Chemistry of Aqueous Systems 3(3,0) Chemical equilibria in aqueous systems, especially natural waters; acids and bases, dissolved CO_2, precipitation and dissolution, oxidation-reduction, adsorption, etc. *Preq:* CH 102 or 106.

CH 421, H421, 621 Advanced Organic Chemistry 3(3,0) Survey of modern organic chemistry with an emphasis on synthesis and mechanisms. *Preq:* CH 224, 332, or equivalent.

CH 425, 625 Medicinal Chemistry 3(3,0) Survey of the pharmaceutical drug discovery process. Covers discovery of candidate compounds, bioassay methods, and associated regulatory and commercial issues. Case studies are selected from the current literature. *Preq:* CH 224 or equivalent or permission of instructor.

CH 427, H427, 627 Organic Spectroscopy 3(2,3) Survey of modern spectroscopic techniques used in the determination of molecular structure. Emphasis is on the interpretation of spectra: nuclear magnetic resonance, ultraviolet, infrared, mass spectroscopy, optical rotatory dispersion and circular dichroism. *Preq:* One year each of organic chemistry and physical chemistry.

CH 435, H435, 635 Atomic and Molecular Structure 3(3,0) Introduction to quantum theory and its application to atomic and molecular systems. Topics include harmonic oscillator, hydrogen atom, atomic and molecular orbital methods, vector model of the atom, atomic spectroscopy, and molecular spectroscopy. *Preq:* CH 332 or consent of instructor.

CH 443 Research Problems 3(0,9) Original investigation of an assigned problem in a fundamental branch of chemistry. Work must be carried out under the supervision of a member of the staff. *Preq:* Senior standing in Chemistry or consent of instructor.

CH 444 Research Problems 3(0,9) Continuation of CH 443.

CH 451, 651 Frontiers in Polymer Chemistry 3(3,0) Survey of selected areas of current research in polymer science with particular emphasis on polymer synthesis. Although a text is required for review and reference, course is primarily literature based and focused on areas of high impact to multi-disciplined technology. *Preq:* CH 223, 224, T C 415 or consent of instructor.

CH 471, 671 Teaching Chemistry 3(3,0) Topics in chemistry addressed in the context of constructivist methodologies. Laboratory work and management, laboratory safety, and the use of technology in the chemistry classroom are also considered. *Preq:* 300-level chemistry course or high school teaching experience or consent of instructor.

CHINESE

Assistant Professors: Y. An, Y. Zhang

CHIN 101 Elementary Chinese 4(3,1) Introductory course stressing speaking, listening, and writing. Attention is given to the sound system of Chinese to enable students to distinguish the four tones and to develop basic communication skills. Participation in cultural activities is encouraged.

CHIN 102 Elementary Chinese 4(3,1) Continuation of CHIN 101. *Preq:* CHIN 101 or consent of instructor.

CHIN 201 Intermediate Chinese 3(3,0) Intermediate course with more emphasis on communication skills and structure. Reading and writing practice without phonetic aids; oral practice in and outside the class, paying special attention to idiomatic usage; introduction to cultural perspectives through readings and cultural activities. *Preq:* CHIN 102 or consent of instructor.

CHIN 202 Intermediate Chinese 3(3,0) Continuation of CHIN 201. *Preq:* CHIN 201 or consent of instructor.

CHIN 203 Chinese Reading and Composition I 4(3,1) Designed for students who already speak Chinese but cannot read and write it well. Covers grammatical points of first-year Chinese with special attention to reading and composition. *Preq:* Consent of instructor.

CHIN 204 Chinese Reading and Composition II 4(3,1) Continuation of CHIN 203. Covers all grammatical points of regular second-year Chinese. Through reading and discussion of materials regarding Chinese linguistics, history, literature, and philosophy, students improve their language skills and acquire a basic knowledge of Chinese culture. *Preq:* CHIN 203 or consent of instructor.

CHIN 305 Chinese Conversation and Composition I 3(3,0) Practice in the spoken language with emphasis on vocabulary, word-combinations, pronunciation, and comprehension. Learning practical language skills and intercultural communication by studying various topics. *Preq:* CHIN 202, 204, or consent of department chair.

CHIN 306 Chinese Conversation and Composition II 3(3,0) Continuation of CHIN 305. More practice in the spoken language with emphasis on vocabulary, word combinations, pronunciation, and comprehension. Learning practical language skills and intercultural communication by studying various topics. *Preq:* CHIN 305 or consent of department chair.

CHIN (PHIL) 312 Philosophy in Ancient China 3(3,0) See PHIL 312.

CHIN (PHIL) 313 Philosophy in Modern China 3(3,0) See PHIL 313.

CHIN 316 Chinese for International Trade I 3(3,0) Study of spoken and written Chinese common to the Chinese-speaking business communities, with emphasis on business practices and writing/translating business letters and professional documents. Cross-cultural references are provided for comparative analyses of American and Chinese business behavior. Classes are conducted in Chinese. *Preq:* CHIN 202, 305 (or concurrent enrollment) or consent of department chair.

CHIN 416 Chinese for International Trade II 3(3,0) Study of language, concepts, and the environment of Chinese-speaking markets of the world. Sociocultural, political, and economic issues relevant to the Chinese-speaking business world and the ramifications of these issues in global marketing. Classes are conducted in Chinese. *Preq:* CHIN 316 or consent of department chair.

CHIN 418 Chinese Culture and Society 3(3,0) Examines basic cultural values and the patterns of Chinese social life. Focus is on Chinese social organization and interpersonal dynamics, including the family system, gender identities, social exchanges and networks. All readings and discussions are in English. May not be used to satisfy general foreign language requirements.

CITY AND REGIONAL PLANNING

Professors: J. B. London, B. C. Nocks; *Associate Professor:* U. Yilmaz; *Assistant Professors:* M. G. Cunningham, J. T. Farris; *Lecturers:* R. W. Bainbridge, J. K. McClurkin, C. H. Matheny, J. R. Parkey

C R P 405, 605 Urban Genesis and Form 3(3,0) Familiarizes professional students in the environmental design disciplines with the origin, development, and growth of cities to enable them to understand the ever accelerating growth of urbanism and increasing complexity of urban organism. *Preq:* Consent of instructor or department chair.

C R P 411, 611 Introduction to City and Regional Planning 3(3,0) Introduces students from other disciplines to City and Regional Planning. Spatial and nonspatial areas of discipline are explored through a wide ranging lecture/seminar program. *Preq:* Consent of instructor or department chair.

C R P 415 Small City and Rural Planning 3(3,0) Examines current and future aspects and challenges of small urban centers and rural areas. May focus on a wide range of subjects (design, economic, social, political, physical, natural resources, environmental) depending on the emphasis at the time.

C R P (E N R, FOR) 434, 634 Geographic Information Systems for Landscape Planning 3(1,6) Develops competency in geographic information systems (GIS) technology and its application to various spatial analysis problems in landscape planning. Topics include data development and management, spatial analysis techniques, critical review of GIS applications, needs analysis and institutional context, GIS hardware and software, hands-on application project.

C R P 440 Computer-Aided Design and Presentation 3(2,4) Provides students with an opportunity to learn and apply effective computer techniques and skills needed to design project presentations using a variety of computer programs. Students apply these programs and techniques to design and develop their own projects for presentation. *Preq:* Consent of instructor.

C R P 472, 672 Planning Process and Administration 3(3,0) Outlines a conceptual framework of planning organizations and tools used in the planning process; potentials of planning and management approaches that address the relationship and integration between techniques and instruments. *Preq:* Consent of instructor.

C R P 474, 674 Real Estate "Master Builder" Development Process 3(3,0) Study of the real estate and land development process from the developer's perspective. Cases and lectures are presented by leading experts in the development industry. Emphasizes who the participants are on the development team and how to become a developer/"master builder" in order to create a superior built environment. *Preq:* Consent of the instructor.

C R P 483, 683 Planning Communication 3(3,0) [W.2] In-depth analysis of methods to communicate planning and policy decisions effectively; attempts to familiarize students with the various communication skills needed by planners, policymakers, and other professionals to become successful practitioners. *Preq:* Consent of instructor or department chair.

CIVIL ENGINEERING

Professors: S. N. Amirkhanian, S. C. Anand, N. M. Aziz, L. C. Bell, R. H. Brown, J. L. Burati, C. H. Juang, J. K. Nelson, *Chair;* R. F. Nowack, P. R. Sparks; *Associate Professors:* T. A. Reinhold, S. D. Schiff, P. A. Work; *Assistant Professors:* R. D. Andrus, W. E. Back, D. B. Clarke, W. A. Sarasua, D. E. Werth, Jr.; *Lecturer:* J. A. Johnson; *Extension Associate:* E. K. Judge; *Visiting Assistant Professor:* S. F. Csernak

C E 200 Structural Mechanics 4(3,3) Builds on statics to develop relationships between external loads on structural elements of civil engineering interest and the resulting internal loads and deformations. Students are exposed to the development of stress and deformation formulas and the identification and use of significant mechanical properties of civil engineering materials. *Preq:* E M 201. *Coreq:* C E 253.

C E 251 Analysis Techniques in Civil Engineering 3(2,3) [C.1] Solution to civil engineering problems using the techniques of dimensional analysis, data analysis, and numerical analyses. The latter includes introduction to FORTRAN programming, simulation analysis, and the numerical solution of systems of linear algebraic equations. *Preq:* ENGR 120. *Coreq:* MTHSC 206.

C E 253 Civil Engineering Measurements 2(3,0) Principles and methods for measurement of loads, load effects, environmental variables, and performance of civil engineering systems. Classes integrate lectures and hands-on applications. Exercises provide students an introduction to sensors, basic electrical circuits, data acquisition systems, and data analysis methods used in civil engineering.

C E 255 Geomatics 3(2,3) Spatial data collection methods including surveying, digital photogrammetry and remote sensing, and global positioning systems. Methods and technologies used to manage, manipulate, and analyze spatial and associated attribute data including geographic information systems.

C E 301 Structural Analysis 3(2,2) Calculation of design loads for buildings and other structures. Use of classical analysis techniques to determine support reactions, internal member forces, and structural displacements of statically determinate and indeterminate structural systems. *Preq:* C E 200 or permission of instructor.

C E 311 Transportation Engineering Planning and Design 3(3,0) Planning, design, and operation of transportation facilities including highways and airports. Coverage includes economic, safety, and environmental considerations. Public transit systems are covered. *Preq:* C E 255, EX ST 301.

C E 321 Geotechnical Engineering 4(3,3) Mechanical and physical properties of soils and their relation to soil action in problems of engineering, such as classification, permeability, shearing strength, and consolidation: design of embankments and retaining walls with geotextiles. *Preq:* C E 200, 253.

C E 331 Construction Engineering and Management 3(3,0) Construction contracts, technical specifications, cost estimating, project scheduling, cost control, materials management, quality control, and quality assurance. *Preq:* Junior standing.

C E 341 Introduction to Fluid Mechanics 4(3,3) Introduction to fluid mechanics, including properties of static and dynamic situations. Problem-solving skills are emphasized, including the principles of mass, momentum, and energy conservation. Special topics include conduit flows and pump systems. Laboratory experiments familiarize students with laboratory techniques and instrumentation. *Preq:* C E 253, E M 202, Junior standing.

C E 342 Applied Hydraulics and Hydrology 3(3,0) Concepts covered are pipe network design, precipitation, evapotranspiration, runoff, hydrograph analysis, flood routing, hydrologic design, open channel flow, design of stable channels, and groundwater hydraulics. A design project involving hydrologic system analysis and design is assigned. *Preq:* C E 341.

C E 350 Economic Evaluation of Projects 3(3,0) [O.1] Comparison of design alternatives based on engineering economic analysis. Introduction of present worth, annual cost, rate of return, and benefit-cost ratio methods. Use of depreciation and taxation in project analysis. Students make oral presentations of historic and current civil engineering projects. *Preq:* Junior standing.

C E 351 Civil Engineering Materials 3(2,3) [O.1] Basic properties of aggregates, Portland cement, and asphalt cement. Classification of aggregates on the basis of size and strength. Properties of Portland cement and asphalt concrete mixtures, mix design procedures, field control and adjustments. Properties of steel and wood. Field trips to nearby plants. *Preq:* C E 253; MTHSC 302 or EX ST 301. *Coreq:* C E 200.

C E 352 Economic Evaluation of Projects 2(2,0) Comparison of design alternatives based on engineering economic analysis. Introduction of present worth, annual cost, rate of return, and benfit-cost ratio methods. Use of depreciation and taxation in project analysis. *Preq:* Junior standing.

C E 353 Professional Seminar 1(1,0) Various professional topics related to skills and techniques for evaluating career opportunities, seeking and obtaining civil engineering employment, career development, professional registration, professional ethics, and other factors necessary for achieving success in a professional career. Enables students to make better decisions that will help them succeed in their careers. *Preq:* Junior standing.

C E H387 Junior Honors Project 1-3 Studies or laboratory investigations on special topics in the civil engineering field which are of interest to individual students and faculty members. Arranged on a project basis for a maximum of individual student effort under faculty guidance. May be repeated for a maximum of three credits. *Preq:* Junior standing in Civil Engineering Senior Departmental Honors Program.

C E H388 Honors Research Topics 1(0,2) Survey of ongoing research in the Civil Engineering Department to identify potential research topics for further individual study. *Preq:* Junior standing in Civil Engineering Senior Departmental Honors Program.

C E H389 Honors Research Skills 1(1,0) Research problem selection, research tools, research reports organization. *Preq:* C E H388.

C E 401 Indeterminate and Matrix Structural Analysis 3(3,0) Analysis of indeterminate structures using moment distribution, energy methods such as virtual work and Castigliano's Theorem, and the matrix formulation of the direct siffness method. *Preq:* C E 301 or permission of instructor.

C E 402 Reinforced Concrete Design 3(3,0) Design of reinforced concrete beams, slabs, columns, and footings using ultimate strength design. An introduction to working stress design methods is included. *Preq:* C E 301 or permission of instructor.

C E 404, 604 Wood and Masonry Structural Design 3(3,0) Introduction to design of structural elements for masonry buildings. Lintels, walls, shear walls, columns, pilasters, and retaining walls are included. Reinforced and unreinforced elements of concrete or clay masonry are designed by allowable stress and strength design methods. Introduction to construction techniques, materials, and terminology used in masonry. *Preq:* C E 402 or permission of instructor.

C E 405, 605 Structural Systems Design 3(3,0) Study of the structural design process including structural requirements, structural systems and materials, specification of loads, and the preliminary design and costing of structural components and systems. *Preq:* C E 301 or permission of instructor.

C E 406 Structural Steel Design 3(3,0) Introduction to the design of structural elements found in steel buildings, in particular the design of steel tension members, beams, columns, beam-columns, and connections. Additional topics include composite members and plate-girders. Emphasis is on the AISC-LRFD Specifications for steel design, though reference is made to the ASD Specification with comparisons made where appropriate. *Preq:* C E 301 or permission of instructor.

C E 407, 607 Wood Design 3(3,0) Introduction to wood design and engineering; properties of wood and wood-based materials; design of beams, columns, walls, roofs, panel systems, and connections. *Preq:* C E 300 and 402 or 406.

C E 410, 610 Traffic Engineering: Operations 3(3,0) Basic characteristics of motor-vehicle traffic, highway capacity, applications of traffic control devices, traffic design of parking facilities, engineering studies, traffic safety, traffic laws and ordinances, public relations. *Preq:* C E 311.

C E 411, 611 Roadway Geometric Design 3(2,3) Geometric design of roadways, at-grade intersections, and interchanges in accordance with conditions imposed by driver ability, vehicle performance, safety, and economics. *Preq:* C E 311.

C E 412, 612 Urban Transportation Planning 3(3,0)F Urban travel characteristics, characteristics of transportation systems, transportation and land-use studies, trip distribution and trip assignment models, city patterns and subdivision layout. *Preq:* C E 311.

C E 421, 621 Geotechnical Engineering Design 3(3,0) Relationship of local geology to soil formations, groundwater, planning of site investigation, sampling procedures, determination of design parameters, foundation design, and settlement analysis. *Preq:* C E 321.

C E 424, 624 Earth Slopes and Retaining Structures 3(3,0) Principles of geology, groundwater and seepage, soil strength, slope stability, and lateral earth pressure and their application to the design of excavations, earth fills, dams, and earth-retaining structures. *Preq:* C E 321 or GEOL 320 or equivalent.

C E 433, 633 Construction Planning and Scheduling 3(3,0) Principles and applications of the Critical Path Method (CPM) and Project Evaluation and Review Techniques (PERT). Project breakdown and network graphics. Identification of the critical path and resulting floats. Definition and allocation of materials, equipment, and manpower resources. Resource leveling, compression, and other network adjustments. Computer applications using packaged routines. *Preq:* C E 331.

C E 434, 634 Construction Estimating and Project Control 3(3,0) Specifications, contracts, and bidding strategies; purchasing and subcontracting policies; accounting for materials, supplies, subcontracts, and labor; procedural details for estimating earthwork, reinforced concrete, steel, and masonry. Overhead and profit items. *Preq:* C E 331 or equivalent.

C E 438, 638 Construction Support Operations 3(3,0) Describes activities necessary for the completion of a construction job although not specifically recognized as direct construction activities: general conditions, safety, security, quality assurance, value engineering; organizational support features and typical implementation procedures. *Preq:* C E 331, EX ST 301.

C E 439, 639 Construction Equipment Selection and Maintenance 3(3,0) Methodology of selecting the right equipment of the right size for each task of the construction job on the basis of power-train characteristics, crew size, terrain conditions, and job requirements. Cycle time, cost, specifications, maintenance, replacement policy, monitoring. *Preq:* C E 331 or equivalent.

C E 446, 646 Flood Hazards and Protective Design 3(3,0) Study of flood hazards and methods of protective design of the built environment. Floodplain mapping and delineation. Methods for determining base flood elevations. Flood-resistant construction, flood proofing, and governmental regulations are discussed. Includes case studies and design projects. *Coreq:* C E 342.

C E 447, 647 Stormwater Management 3(3,0) Evaluation of peak discharges for urban and rural basins, design of highway drainage structures such as inlets and culverts; stormwater and receiving water quality; best management practices, detention and retention ponds, and erosion and sediment control. *Preq:* C E 342; *Coreq:* EE&S 401 or permission of instructor.

C E 455, 655 Properties of Concrete and Asphalt 3(2,3) Properties of aggregate, concrete, and asphalt are discussed. Concrete and asphalt mix designs are conducted in the laboratory. *Preq:* C E 200, 351, EX ST 301 or MTHSC 302.

C E 459 Capstone Design Project 3(1,6) [O.1] Students apply creativity with their engineering knowledge in the solution of open-ended civil engineering problems. Problems are formulated and solutions are evaluated by faculty and practicing engineers. Oral communication skills are developed through presentations, correspondence, and project reports. *Preq:* All required 300-level C E courses and the Technical Design Requirement.

C E 462, 662 Coastal Engineering I 3(3,0) Introduction to coastal and oceanographic engineering principles, including wave mechanics, wave-structure interaction, coastal water-level fluctuations, coastal-zone processes, and design considerations for coastal structures and beach nourishment project. *Preq:* C E 341 or E M 320.

C E 482, 682 Groundwater and Contaminant Transport 3(3,0) Basic principles of groundwater hydrology and transport of contaminants in groundwater systems; groundwater system characteristics; steady and transient flow; well hydraulics, design, and testing; contaminant sources, movement and transformations. *Preq:* C E 341. *Coreq:* EE&S 401.

C E H487 Senior Honors Project 1-3 Studies or laboratory investigations on special topics in civil engineering which are of interest to individual students and faculty members. Arranged on a project basis for a maximum of individual student effort under faculty guidance. May be repeated for a maximum of three credits. *Preq:* Senior standing in Civil Engineering Senior Departmental Honors Program.

C E H488 Honors Research I 2-3 Individual research under the direction of a Civil Engineering faculty member. *Preq:* C E H389.

C E H489 Honors Research II 3(3,0) Individual research under the direction of a Civil Engineering faculty member. *Preq:* C E H488

C E 490, 690 Special Projects 1-3(1-3,0) Studies or laboratory investigations on special topics in the civil engineering field which are of interest to individual students and staff members. Arranged on a project basis with a maximum of individual student effort and a minimum of staff guidance. May be repeated for a maximum of three credits. *Preq:* Senior standing.

C E 491, 691 Selected Topics in Civil Engineering 1-6(1-6,0) Structured study of civil engineering topics not found in other courses. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

CLEMSON UNIVERSITY

C U 101 University Success Skills 2(3,0) A variety of topics critical to students' success is introduced. Topics include time management, goal setting, test taking, campus resources and policies, critical thinking, and diversity. Students are given opportunities to discover and practice many procedures, techniques, and tips. Limited to freshmen and first semester transfer students.

COACHING EDUCATION

C ED 349 Introduction to Coaching 3(3,0) Investigation into the scientific basis of the coaching profession. Topics include physiology, kinesiology, and psychology as well as administration of an athletic program.

C ED 350 Scientific Basis of Coaching I: Exercise Physiology 3(3,0) Increases understanding of basic scientific information concerning athletic performance by using the conceptual approach. In-depth investigation into the physiological principles that can enhance athletic performance is the primary focus. Phases of physical training as well as comprehensive evaluative techniques are included. *Preq:* C ED 349.

C ED 352 Scientific Basis of Coaching II: Kinesiology 3(3,0) Increases students' understanding of basic scientific information concerning athletic movement by utilizing the conceptual approach. Deals with the basic laws of human motion necessary in evaluation of athletic movement, utilizing joint structure and anatomic landmarks as a basis for motion. *Preq:* C ED 349.

C ED 353 Theory of Prevention and Treatment of Athletic Injuries 3(2,3) Increases students' understanding of principles involved in the prevention and treatment of athletic injuries. Deals with basic anatomy, first aid, and diagnostic techniques necessary for the understanding of basic athletic training procedures. *Preq:* C ED 349.

C ED 361 Administration and Organization of Athletic Programs 3(3,0) Study of modern techniques and practices used in administering athletic programs. Major emphasis areas such as practice and game organization, purchase and care of equipment, budget and finances, public relations, and legal liability in athletic programs are presented. *Preq:* C ED 349.

C ED 362 Psychology of Coaching 3(3,0) Study of psychological techniques utilized to promote maximum athletic performance. Areas of emphasis include motivation, coaching philosophy, athletic personality, mental preparation, and goal-oriented behavior. Not open to students who have taken C ED 342. *Preq:* C ED 349.

C ED 371 Coaching Baseball 1(0,3) Increases understanding of basic technical and practical information concerning the coaching of baseball by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Preq:* C ED 349.

C ED 372 Coaching Basketball 1(0,3) Increases understanding of basic technical and practical information concerning the coaching of basketball by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Preq:* C ED 349.

C ED 373 Coaching Cross Country 1(0,3) Increases understanding of technical and practical information concerning the coaching of cross country by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Preq:* C ED 349.

C ED 374 Coaching Football 1(0,3) Increases understanding of basic technical and practical information concerning the coaching of football by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Preq:* C ED 349.

C ED 375 Coaching Soccer 1(0,3) Increases understanding of basic technical and practical information concerning the coaching of soccer by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Preq:* C ED 349.

C ED 376 Coaching Strength and Conditioning 1(0,3) Increases understanding of basic technical and practical information concerning the coaching of strength and conditioning by utilizing the conceptual approach. Students study basic principles of coaching, training programs, and equipment appraisal as a means to improve athletic performance. Total program development is also covered as it pertains to specific levels of competition. *Preq:* C ED 349.

C ED 377 Coaching Track and Field 1(0,3) Increases understanding of basic technical and practical information concerning the coaching of track and field by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Preq:* C ED 349.

C ED 453, 653 Athletic Injuries: Prevention, Assessment and Rehabilitation 3(3,0) Gives students an understanding of prevention, treatment, and rehabilitation procedures of injured athletes. *Preq:* C ED 349.

COMMUNITY AND RURAL DEVELOPMENT

(See also courses listed under Agricultural and Applied Economics.)

Professors: D. L. Barkley, G. L. Bradford, M. S. Henry, E. L. McLean; *Assistant Professor:* M. Espey

C R D 357 Natural Resources Economics 3(3,0)F Principles and problems involved in the use of soil, water, forest, and mineral resources, with special emphasis on economic aspects of alternative methods of resource utilization. *Preq:* AP EC 202, ECON 200 or 211.

C R D (AP EC, HLTH) 361 Introduction to Health-Care Economics 3(3,0)F Introductory course in which students learn the basic economics of the institutions comprising the health-care industry. Topics include the underlying supply, demand, and institutional factors impacting health-care availability and cost of health care.

C R D (AP EC) 411, 611 Regional Impact Analysis 3(3,0) Techniques for analysis of the growth and decline of regions including economic-base theory, shift share, regional input-output, regional econometric models, and fixed impact models. *Preq:* AP EC 202 or ECON 211 and 212.

C R D (AP EC) 412, 612 Spatial Competition and Rural Development 3(3,0)S Development of rural economic activity in the context of historical, theoretical, and policy aspects of friction associated with spatial separation. Location factors, transfer costs, location patterns, and regional-growth policy are considered. *Preq:* AP EC 202 or ECON 211 or equivalent.

C R D (AP EC) 491 Internship, Agribusiness, and Community and Rural Development 1-6(0,2-12) Internship under faculty supervision in an approved agency or firm. Internships are designed to provide students with work experience in agri-business or community and rural development. Students submit a comprehensive report within one week of the end of the internship. A maximum of six internship credits may be earned. *Preq:* Junior standing and/or consent of instructor.

COMPUTER SCIENCE

Professors: R. M. Geist III, S. M. Hedetniemi, S. T. Hedetniemi, D. P. Jacobs, P. K. Srimani, *Chair;* J. M. Westall, Jr.; *Associate Professors:* H. C. Grossman, E. O. Hare, A. W. Madison, B. A. Malloy, J. D. McGregor, R. P. Pargas, M. Sitaraman, M. K. Smotherman, C. A. Soderlund, D. E. Stevenson; *Assistant Professors:* T. A. Davis, A. T. Duchowski, A. Kaplan; *Lecturers:* J. H. Jones, R. S. Lambert, R. M. Lowe, C. F. Pellerin, H. A. Pellerin, P. D. Sterling; *Visiting Lecturer:* C. A. Hochrine

CP SC 101, H101 Computer Science I 4(3,2) [C.3] Introduction to modern problem solving and programming methods. Special emphasis is placed on algorithm development and software life cycle concepts. Includes use of appropriate tools and discusses ethical issues arising from the impact of computing upon society. Intended for students concentrating in computer science or related fields. *Preq:* MTHSC 105 or satisfactory score on the Clemson Mathematics Placement Test or consent of instructor.

CP SC 102, H102 Computer Science II 4(3,2) Continuation of CP SC 101. Continued emphasis on problem solving and program development techniques. Typical numerical, nonnumerical, and data processing problems are examined. Basic data structures are introduced. *Preq:* CP SC 101.

CP SC 105 Essential Computer Skills 1(0,2) Computer literacy, user environments, and software packages for education. Credit may not be received for both CP SC 105 and 120.

CP SC 110, H110 Elementary Computer Programming 3(3,0) [C.3] Introduction to computer programming and its use in solving problems, intended primarily for technical majors. Basic instruction in programming techniques is combined with tools use and discussions of ethical issues arising from the impact of computing on society.

CP SC 111 Elementary Computer Programming in C/C++ 3(3,0) [C.3] Introduction to computer programming in C/C++ and its use in solving problems. Intended primarily for technical majors. Basic instruction in programming techniques is combined with tools use and discussions of ethical issues arising from the impact of computing on society.

CP SC 120 Introduction to Information Technology 3(2,2) [C.3] Investigation of ethical and societal issues based on the expanding integration of computers into our everyday lives. Historical background, terminology, new technologies and the projected future of computers are considered. Practical experience with common computer software technologies is included. Will not satisfy computer science requirements in any computer science major.

CP SC 130 Data Processing with COBOL 3(3,0) Introduction to data processing techniques and applications, emphasizing organization and processing of data files. COBOL programming language is used. *Preq:* CP SC 110 or 120, or equivalent.

CP SC 157 Introduction to C Programming 2(2,0) Introduction to basic programming techniques. The C programming language is used.

CP SC 210 Programming Methodology 4(3,2) [C.3] Introduction to programming techniques and methodology. Topics include structured programming, stepwise refinement, program design and implementation techniques, modularization criteria, program testing and verification, basic data structures, and analysis of algorithms. Credit may not be received for both CP SC 102 and 210. *Preq:* CP SC 111 or equivalent; satisfactory performance on a pretest.

CP SC 211 Advanced Programming Methodology 4(3,2) [C.1] Introduction to problem solving and programming methodology. Emphasis is on program design and implementation techniques, program testing and verification, and basic algorithm analysis. *Preq:* High school programming course.

CP SC 212 Algorithms and Data Structures 4(3,2) Study of data structures and algorithms fundamental to computer science; abstract data-type concepts; measures of program running time and time complexity; algorithm analysis and design techniques. Credit may not be received for both CP SC 212 and 340. *Preq:* C or better in CP SC 102 or 210.

CP SC 215 Tools and Techniques for Software Development 3(2,2) Intensive course on software development using an imperative language. Topics include typical program development tools such as debuggers and "make" files, software development and testing techniques such as separate module development and testing, pointers and explicit heap management, and low-level file I/O. *Preq:* C or better in CP SC 212.

CP SC 220 Microcomputer Applications 3(3,0) Applications of microcomputers to formulate and solve problem models. Emphasis is placed on applications development in database and spreadsheet environments. Current software products are used. *Preq:* CP SC 120 or MGT 399 or equivalent experience.

CP SC 221 Introduction to a Computer Organization 1(0,2) Introduction to the systems programming environment; languages and interfaces for programming operating systems tasks; use of the C programming language and UNIX operating system. *Preq:* C or better in CP SC 102 or 210.

CP SC 231 Introduction to Computer Organization 4(3,2) Study of the machine architectures on which algorithms are implemented; requirements of architectures that support high-level languages, programming environments, and applications. *Preq:* C or better in CP SC 102 or 210.

CP SC 270 Fundamentals of Information Systems 4(3,2) Computer information systems in a large-scale computing environment are used to address systems analysis and design, database management, data communication, and security of information. Reading knowledge of a business-oriented programming language is developed. May not be counted for credit toward a Computer Science or Computer Information Systems degree. *Preq:* CP SC 120.

CP SC 281 Selected Topics in Computer Science 1-4(0-3,0-6) Areas of computer science in which new trends arise. Innovative approaches to a variety of problems in the use and understanding of basic computing concepts are developed and implemented. May be repeated for a maximum of eight credits, but only if different topics are covered. *Preq:* Consent of instructor.

CP SC 291 Seminar in Professional Issues I 1(1,0) Impact of computer use on society is considered. Ethical use of software and protection of intellectual property rights are discussed. The profession is viewed historically; organizations important to the profession are discussed; the development process for standards is presented; and students are introduced to the professional literature. *Preq:* CP SC 102 or 210, or consent of instructor.

CP SC 330 Computer Systems and Networks 3(3,0) Introduction to the structure of computer systems and networks. Various hardware/software configurations are explored and presented. Topics include basic computer organization, input/output organizations, interrupt processing, system software, standard network architectures and network protocols. *Preq:* C or better in CP SC 215, 231 and E C E 201.

CP SC 332 Computer Systems 3(3,0) Introduction to design, integration, and use of hardware and software components in standard computer systems. Emphasis is on computer organization at the component level, interfacing, basic operating system functions, and system utilities. Credit may not be received for both CP SC 332 and 422. *Preq:* C or better in CP SC 215, 231.

CP SC 340 Algorithms and Data Structures 3(3,0) Basic concepts of data structures such as queues, stacks, and lists; methods of proof as they relate to program verification; sets, functions, and relations as they relate to the analysis of algorithms. Includes the study of algorithms, time complexity, and design techniques. Credit may not be received for both CP SC 212 and 340. *Preq:* CP SC 102 or 210.

CP SC 350 Foundations of Computer Science 3(3,0) Development of the theoretical fundations of programming, algorithms, languages, automata, computability, complexity, data structures, and operating systems; a broad range of fundamental topics is consolidated and extended in preparation for further study. *Preq:* C or better in CP SC 212 and MTHSC 119.

CP SC 360 Distributed and Network Programming 3(3,0) Introduction to basic concepts in distributed systems. Network programming methods are considered. Data communications such as protocols, basic hardware components, performance and limitations are reviewed. *Preq:* C or better in CP SC 215.

CP SC 361 Data Management Systems Laboratory 1(0,2) Introduction to mainframe environments typical of large-scale data processing applications; programming languages, control languages, and file utilities; use of COBOL language and IBM JCL. *Preq:* CP SC 102 or 210; or equivalent. *Coreq:* CP SC 360.

CP SC 371 Systems Analysis 3(3,0) Incorporates a study of the decision-making process at all levels with the logical design of information systems. Extensive study of the system life cycle with emphasis on current as well as classical techniques for describing data flows, data structures, file design, etc. *Preq:* CP SC 360.

CP SC 372 Introduction to Software Development 3(3,0) Techniques and issues in software design and development; tools, methodologies, and environments for effective design, development, and testing of software; organizing and managing the development of software projects. *Preq:* C or better in CP SC 215.

CP SC H395 Honors Seminar 1(1,0) Research topics in various areas of computer science are presented. Methods for identifying and initiating research projects in various areas of computer science are considered. May be repeated for a maximum of two credits. *Preq:* Admission to Departmental Honors Program.

CP SC 405, 605 Introduction to Graphical Systems Design 3(3,0) Principles, computational techniques, and design concepts needed for designing systems for effective graphical displays. *Preq:* C or better in MTHSC 108, MTHSC 311, CP SC 215.

CP SC 411, 611 Virtual Reality Systems 3(3,0) Design and implementation of software systems necessary to create virtual environments. Techniques for achieving real-time, dynamic display of photorealistic, synthetic images are discussed. Includes hands-on experience with electromagnetically-tracked, head-mounted displays and requires, as a final project, the design and construction of a virtual environment. *Preq:* C or better in MTHSC 108, 311, CP SC 215.

CP SC 412, 612 Eye Tracking Methodology and Applications 3(3,0) Introduction to the human visual system; visual perception; eye movements; eye tracking systems and applications in psychology, industrial engineering, marketing, and computer science; hands-on experience with real time, corneal-reflection eye trackers, experimental issues. Final project requires the execution and analysis of an eye tracking experiment. *Preq:* CP SC 360, I E 488, MKT 431, or PSYCH 310.

CP SC 422, 622 Introduction to Operating Systems 3(3,0) Detailed study of the management techniques for the control of computer hardware resources. Topics include interrupt systems, primitive level characteristics of hardware and the management of memory, processor, devices, and data. Credit may not be received for both CP SC 332 and 422. *Preq:* C or better in CP SC 231, 360.

CP SC 423, H423, 623 Implementation of Operating Systems 3(2,2) Detailed review of the implementation of an existing, multi-tasking operating system. Extension of concepts in laboratory to development and implementation of a system nucleus supporting multi-tasking and process coordination on an actual computer system. Emphasis is given to design decisions as they apply to performance and complexity. *Preq:* CP SC 332 or 422 or equivalent.

CP SC 428, 628 Design and Implementation of Programming Languages 3(3,0) Overview of programming language structures and features and their implementation. Control and data structures found in various languages are studied. Runtime organization and environment and implementation models are also included. *Preq:* C or better in CP SC 231 and 360.

CP SC 429, H429, 629 Translation of Programming Languages 3(3,0) Techniques and considerations for compiling and interpreting programming languages. Topics include scanning, parsing, optimization, code generation, and their theoretical foundations. Implementation of a compiler or a major component of a compiler normally is a term project. *Preq:* CP SC 350, 428.

CP SC 450, H450, 650 Theory of Computation 3(3,0) Introduction to models of computation and machine description languages, including finite-state automata and regular expressions, pushdown automata and context-free languages, and Turing machines and recursive functions. Topics include equivalence and relative computing power of the models studied, enumeration, Church's thesis, and undecidability problems. *Preq:* CP SC 350.

CP SC 455, 655 Computational Science 3(3,0) Introduction to the methods and problems of computational science. Course uses problems from engineering and science to develop mathematical and computational solutions. Case studies use techniques from Grand Challenge problems. Emphasizes the use of networking, group development, and modern programming environments. *Preq:* MTHSC 108, 311 and previous programming experience in a higher level language.

CP SC 462, H462, 662 Database Management Systems 3(3,0) Introduction to database/data communications concepts as related to the design of online information systems. Problems involving structuring, creating, maintaining, and accessing multiple-user databases are presented and solutions developed. Comparison of several commercially available teleprocessing monitor and database management systems is made. *Preq:* CP SC 360.

CP SC 463, 663 Online Systems 3(3,0) In-depth study of the design and implementation of transaction processing systems and an introduction to basic communications concepts. A survey of commercially available software and a project using one of the systems are included. *Preq:* CP SC 462.

CP SC 464, 664 Introduction to Computer Architecture 3(3,0) Survey of von Neumann computer architecture at the instruction-set level. Fundamental design issues are emphasized, illustrated using historical and current mainframe, supermini, and micro architecture. *Preq:* CP SC 330 or consent of instructor.

CP SC 472, H472, 672 Software Development Methodology 3(3,0) Advanced topics in software development methodology. Techniques such as chief programmer teams, structured design and structured walk-throughs are discussed and used in a major project. Emphasis is on the application of these techniques to large-scale software implementation projects. Additional topics such as mathematical foundations of structured programming and verification techniques are also included. *Preq:* CP SC 360 and 372.

CP SC 481, H481, 681 Selected Topics 1-3(1-3,0) Areas of computer science in which non-standard problems arise. Innovative approaches to problem solutions which draw from a variety of support courses are developed and implemented. Emphasis is on independent study and projects. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

CP SC 491 Seminar in Professional Issues II 1(1,0) Impact of computing system development on society is considered. Ethical issues in the design and development of computer software are discussed. Standards for professional behavior, the professional's responsibility to the profession, and techniques for maintaining currency in a dynamic field are discussed by students. *Preq:* Senior standing.

CP SC H495 Senior Thesis Research 1-3(1-3,0) Directed individual research project for honors students supervised by departmental faculty. May be repeated for a maximum of six credits. *Preq:* Senior standing.

CONSTRUCTION SCIENCE AND MANAGEMENT

Professor: R. W. Liska, *Chair; Associate Professors:* F. M. Eubanks, R. K. Schneider; *Assistant Professors:* S. N. Clarke, D. W. Goodloe, C. A. Piper, R. Soares; *Lecturers:* C. L. B. Addison, D. C. Bausman

C S M 100 Introduction to Construction Science and Management 3(3,0) Introduction to the construction industry and the Construction Science and Management Department. *Preq:* Construction Science and Management major or consent of department chair.

C S M 201 Structures I 3(3,0) Study of statically determinate structural components and systems including force applications and distributions in structural elements and the resulting stress-strain patterns in axial, shear, and bearing mechanisms. *Preq:* MTHSC 102 or 106, PHYS 207; Construction Science and Management or Architecture major or consent of department chair.

C S M 202 Structures II 3(3,0) Study of force distribution and behavior in statically determinate wood and steel structural components and systems including shear and moment stress, combined loading/stress conditions and deflections. *Preq:* C S M 201, Construction Science and Management or Architecture major or consent of department chair.

C S M 203 Materials and Methods of Construction I 3(3,0) Descriptive study of the materials and methods of construction, focusing on nomenclature, building materials, and assembly of building systems consisting primarily of wood, masonry, residential interior and exterior finishes, and building foundations. *Preq:* Construction Science and Management or Architecture major or consent of department chair. *Preq or Coreq:* A A H 210, ARCH 210, C S M 100 (Construction Science and Management major).

C S M 204 Contract Documents 3(2,3) Introduction to working drawings, specifications, and the various documents required to carry out a typical construction project. *Preq:* Construction Science and Management major or consent of department chair. *Coreq:* C S M 205.

C S M 205 Materials and Methods of Construction II 3(3,0) Descriptive study of materials and methods of construction, focusing on nomenclature, building materials, and assembly of building systems consisting primarily of steel and concrete in addition to roofing assemblies and interior and exterior commercial finishes. *Preq:* C S M 203, Construction Science and Management or Architecture major or consent of department chair.

C S M 301 Structures III 3(3,0) Analysis and design of basic determinate and indeterminate masonry and reinforced concrete structural components and systems; introduction to special structural systems and seismic loading. *Preq:* C S M 202, PHYS 208, Construction Science and Management or Architecture major or consent of department chair.

C S M 303 Soils and Foundations 3(2,3) Various types of soils are studied, including related activities of testing, compaction, stability, and function. *Preq:* C S M 202, Construction Science and Management major or consent of department chair.

C S M 304 Environmental Systems I 3(3,0) Theory of heating, ventilating, air conditioning, electrical, lighting, and plumbing systems as related to building. *Preq:* C S M 205, PHYS 208, Construction Science and Management or Architecture major or consent of department chair.

C S M 310 Principles of Industrial Safety Management 3(3,0) Fundamentals of industrial safety management, including loss prevention, industrial hygiene and fire protection. *Preq:* Junior standing, Construction Science and Management major or consent of department chair.

C S M 311 Accident Prevention and Loss Control 3(3,0) Philosophies and techniques of accident prevention and loss control, including risk assessment, hazard analysis, accident/near miss investigation, and methods to control and correct loss-producing conditions; also application of these techniques to current technologies. *Preq:* Junior standing, Construction Science and Management major or consent of department chair.

C S M 312 Industrial Recognition and Control 3(3,0) Application of basic physical properties to the understanding, recognition, evaluation, and control of biological, mechanical, electrical, thermal, chemical, ergonomic, and nuclear hazards in the industrial setting. *Preq:* Junior standing, Construction Science and Management major or consent of department chair.

C S M 351 Construction Estimating 3(3,0) Basic estimating as applied to construction projects. Includes the take-off of material quantities, assigning labor and equipment production rates, and applying material prices, wage rates, and equipment costs to derive a total job cost. *Preq:* C S M 204, 205, CP SC 120, all required MTHSC courses, Construction Science and Management major or consent of department chair. *Preq or Coreq:* B E 221, C S M 303.

C S M 352 Construction Scheduling 3(3,0) Analysis of construction projects with emphasis on estimating, scheduling, and resource leveling. *Preq:* C S M 304 (or concurrent enrollment), 351, Construction Science and Management major or consent of department chair. *Coreq:* C S M 353.

C S M 353 Construction Estimating II 3(3,0) Continuation of basic construction estimating with the additional component of computerized estimating. Includes material, labor and equipment costs, production rates, bid ethics, constructability analysis, and understanding of other types of estimating procedures. *Preq:* C S M 301, 304 (or concurrent enrollment), 351, Construction Science and Management major or consent of department chair. *Coreq:* C S M 352.

C S M 410 Fire Protection and Prevention 3(3,0) Fundamental course to increase awareness of causes of uncontrolled fires and explosions. Associated dangers to life, property, and industrial/commercial productivity are stressed, along with techniques available for their protection (education, detection, suppression). *Preq:* Junior standing, Construction Science and Management major or consent of department chair.

C S M 411 Safety in Building Construction 3(3,0) Study of construction safety management and controls. *Preq:* Construction Science and Management major or consent of department chair. *Coreq:* C S M 453.

C S M 453 Construction Project Management 3(2,4) Study of construction business organization, methods of project delivery, field organization, policy, ethics, project management, control systems, labor management relations, and productivity. *Preq:* C S M 352, 353, LAW 322 (or concurrent enrollment), MGT 307 (or concurrent enrollment), Construction Science and Management major or consent of department chair. *Coreq:* C S M 411, 461.

C S M 454 Construction Capstone 6(3,12) Terminal project is accomplished that demonstrates a refinement of previous knowledge gained in technical, management, and general education courses. *Preq:* C S M 453, Construction Science and Management major or consent of department chair.

C S M 455, 655 Reducing Adversarial Relations in Construction 3(3,0) Focuses on the study of the delivery of projects and how adversarial relations can affect the successful completion of the venture. Topics include management of human resources, understanding the needs and processes of the participants, where problems lie, methods of avoiding and settling disputes. *Preq:* Construction Science and Management or Architecture major, senior standing or consent of department chair.

C S M 461 Construction Economics Seminar 3(3,0) Studies in the financial performance of construction companies. *Preq:* ACCT 201, ECON 211, 212, Construction Science and Management major or consent of department chair. *Coreq:* C S M 453.

C S M 490, H490 Directed Studies 1-3(1-3,0) Comprehensive studies and research of special topics not covered in other courses. Emphasis is placed on field studies, research activities, and current development in construction science. May be taken for a maximum of six credits. *Preq:* Consent of instructor.

C S M 491 Construction Science and Management Internship and Examination 0 Eight hundred hours of verifiable construction-related experience. Verification of having taken the Certified Professional Constructor Examination.

C S M 498 Current Topics in Construction 1-3(1-3,0) Study of current topics in the construction industry not central to other construction science courses. Specific titles and course descriptions to be announced from semester to semester. May be taken for a maximum of six credits. *Preq:* Consent of advisor.

CROP AND SOIL ENVIRONMENTAL SCIENCE

Professors: R. E. Franklin, B. J. Gossett, W. D. Graham, Jr., *Chair;* H. T. Knap, A. R. Mazur, V. L. Quisenberry, J. S. Rice, E. R. Shipe, H. D. Skipper, B. R. Smith, S. U. Wallace, T. Whitwell; *Associate Professors:* W. C. Stringer, N. H. Walker, R. A. Wing; *Assistant Professor:* J. K. Norsworthy

CSENV 100 Introduction to Crop and Soil Environmental Science 1(1,0)F Introduction to and survey of the agronomic and soil sciences and their application to current societal issues: career guidance, opportunities for professional certification, and discussion of skills used by agronomists and soil scientists.

CSENV 202 Soils 4(3,2) Introduction to world land resources, soil formation, classification, and mineralogy. Emphasis is on the basic chemical and physical properties of soil. Soil microorganisms, plant nutrients, and fertilization are discussed. Soil properties are related to growth. *Preq:* CH 101, 102 or a geology sequence including GEOL 101, or consent of instructor.

CSENV 350 Practicum 1-3 Preplanned internship undertaken with an approved agency concerned with agronomic practices. Restricted to students with a minor in Crop and Soil Environmental Science. Maximum of three credits allowed. *Preq:* Consent of department chair.

CSENV 403, 603 Soil Genesis and Classification 2(1,3)F Study of soil morphology and characterization, pedogenic processes, soil-forming factors, and classification of soils. *Preq:* CSENV 202 or consent of instructor.

CSENV 404, 604 Soils and Land Use 2(1,3)F Soils interpretations for nonagricultural purposes and facilities. Emphasis is on use of modern soil surveys and properties and features of soils important in nonfarm land uses. Not open to Crop and Soil Environmental Science minors or to students who have taken CSENV 202.

CSENV 405, 605 Plant Breeding 3(2,2)S Application of genetic principles to the development of improved crop plants. Principal topics include the genetic and cytogenetic basis of plant breeding, mode of reproduction, techniques in selfing and crossing, methods of breeding, inheritance in the major crops, and biometrical methods. *Preq:* GEN 302 or equivalent.

CSENV 406 Special Problems 1-3(0,3-9) Acquaints students with the scientific method. Literature investigation, planning, and execution of an experiment are integral parts of the course. Not open to AGRIC H491 and H492 students. Maximum of six credits allowed. *Preq:* Senior standing as a minor in Crop and Soil Environmental Science and consent of department chair.

CSENV 407, H407, 607 Weed Ecology and Management 3(2,2)F Weeds, their introduction, ecology, methods of reproduction, dissemination, and management; chemistry and mode of action of herbicides, equipment and techniques of application; and a characterization of the common weeds of the Southeast. *Preq:* AGRIC 104, CSENV 202, or consent of instructor.

CSENV (B E) 408, 608 Land Treatment of Wastewater and Sludges 3(3,0)S Principles for designing environmentally acceptable land application systems using municipal and industrial wastewater and sludges are presented. Topics include land-limiting constituent analysis; soil-plant interactions; system equipment and design; system operation and management; public acceptance, social, and regulatory issues. Case studies and field trip(s) are planned. *Preq:* Senior standing in Agriculture or Engineering or consent of instructor.

CSENV 421, 621 Principles of Field Crop Production 3(3,0)F Principles for production of field crops. Topics include botany and physiology, tillage, harvesting, storage, and crop quality. Principles are illustrated using examples from various crops. *Preq:* AGRIC 104 or equivalent introductory plant science, CSENV 202.

CSENV 422, 622 Major World Crops 3(3,0)S Examines the distribution, adaptation, production, and utilization of major agronomic crops of the world. Emphasizes crops important to U.S. agriculture. Specific crops discussed in more detail include corn, wheat, rice, sorghum, soybean, cotton, tobacco, and peanuts. *Preq:* AGRIC 104 or equivalent introductory plant science, CSENV 202.

CSENV 423, H423, 623 Field Crop—Forages 3(3,0)S Establishment, management, and utilization of forage crops in a forage-livestock agroecosystem context. Hay, silage, and pasture utilization are discussed. Computer model used to study complexity of forage-livestock production systems. *Preq:* AGRIC 104, CSENV 202, or consent of instructor.

CSENV 424, 624 Applied Aspects of Forage Management 1(0,2) Hands-on exposure to forage plantings, establishment and management practices. Pasture and harvested forage systems, equipment and practices; analysis of forage-livestock systems. *Preq:* CSENV 423 (or concurrent enrollment).

CSENV 425, 625 Seed Science and Technology 3(2,2)S Even-numbered years. Topics include seed development, germination, dormancy, pathology, storage, and deterioration. Seed testing and commercial production of seed are also covered. Emphasis is on useful applications of current seed science knowledge. *Preq:* AGRIC 104, BIOSC 205.

CSENV (AP EC) 426, 626 Cropping Systems Analysis 3(2,2)F Application of agronomic and economic principles in solving problems relating to production and marketing of agronomic crops. Major part of the course is a case study in which detailed analysis of a farm, agri-business or environmental situation is made with students making formal written and oral presentations of results. *Preq:* AP EC 202, AGRIC 104, Junior standing.

CSENV (HORT) 433, 633 Integrated Weed Management for Agronomic and Horticultural Crops 3(2,2)S See HORT 433.

CSENV 446, 646 Soil Management 3(3,0)F Basic soil properties are related to compaction, water and solute movement, and root growth. Practical management problems are considered and solutions developed based on basic soil characteristics. Problems include erosion, no-tillage, compaction, irrigation, leaching, waste application, golf-green management, and orchard establishment. *Preq:* CSENV 202.

CSENV 452, 652 Soil Fertility and Management 3(3,0)S Soil properties, climatic factors, and management systems in relation to soil fertility maintenance for crop production; plant nutrition and growth in relation to crop fertilization and management. *Preq:* CSENV 202 or consent of instructor.

CSENV 453, H453, 653 Soil Fertility Laboratory 1(0,3)S Evaluation and interpretation of soil fertility production. *Preq:* CSENV 202 or consent of instructor.

CSENV 455 Seminar 1(1,0)F Student presentation of current agronomic topics of special interest in crop production appearing in recent scientific journals and other publications.

CSENV 475, H475, 675 Soil Physics and Chemistry 3(2,3)S Study of the principles of soil physics and chemistry and their applications. Topics include soil texture, structure, compaction, water relations, solute movement, mineral composition, adsorption phenomenon, and soil acidity. *Preq:* CSENV 202, CH 101, PHYS 207.

CSENV 490, 690 Beneficial Soil Organisms in Plant Growth 3(3,0)S Aspects of biological nitrogen fixation, mycorrhizal fungi, microbial-pesticide interactions, bioremediation, nutrient cycles, and biological pest control related to plant growth, soil/environmental quality; and sustainable agriculture are covered. Students who desire laboratory experience in these topics can register for CSENV 406 after consultation with instructor. *Preq:* CSENV 202, MICRO 305, PL PA 401, or consent of instructor.

DANCE

DANCE 150 Modern Dance I 1(0,3) Introduction to the basic principles of dance movement and vocabulary. Active exploration and application of body alignment and theory. Students who have received credit for L S 190 may not also receive credit for DANCE 150.

DESIGN STUDIES

Professors: J. R. Caban, *Chair;* L. G. Craig, R. J. Hogan, J. D. Jacques, Y. Kishimoto, R. B. Norman; *Associate Professors:* H. C. Harritos, N. J. Hurt, R. T. Silance; *Assistant Professor:* J. A. Erdman; *Lecturers:* L. A. Brown, A. H. Jacques, P. L. Laurence, M. R. Zell

DSIGN 151 Design Studies I 3(1,6) Introduction to problem-solving methodology for environmental design through studio exercises, projects, and reviews. *Coreq:* DSIGN 153, admission to the College of Architecture.

DSIGN 152 Design Studies II 3(1,6) Continuation of DSIGN 151. *Preq:* DSIGN 151. *Coreq:* DSIGN 154.

DSIGN 153 Design Theory I 1(1,0) Introduction to concepts and principles of architecture, visual arts, landscape architecture, urban and regional planning, and construction management. *Coreq:* DSIGN 151.

DSIGN 154 Design Theory II 1(1,0) Continuation of DSIGN 153. *Coreq:* DSIGN 152.

DSIGN 251 Design Studies III 5(0,10) Studio work with adjunct demonstrations and lectures concerned with basic architectural design problems. *Preq:* DSIGN 152. *Coreq:* DSIGN 253.

DSIGN 252 Design Studies IV 5(0,10) Continuation of DSIGN 251. *Preq:* DSIGN 251. *Coreq:* DSIGN 254.

DSIGN 253 Design Theory III 1(1,0) Introduction to fundamental ideas and issues of architecture through the presentation of topics on theory, technology, and practice.

DSIGN 254 Design Theory IV 1(1,0) Continuation of DSIGN 253.

DSIGN 321 Wood Shop Practices, Materials, Tools, and Equipment 3(1,6) Instruction in the use of a full range of shop machinery, tools, equipment, and craftsmanship as well as an orientation to a wide variety of materials, techniques, and procedures. The paramount importance of safety is continually emphasized. *Preq:* Consent of instructor.

DSIGN 351 Design Studies V 5(0,10) Studio work with adjunct demonstrations and lecturers concerned with intermediate architectural design problems. *Preq:* DSIGN 252. *Coreq:* DSIGN 353.

DSIGN 352 Design Studies VI 5(0,10) Continuation of DSIGN 351. *Preq:* DSIGN 351. *Coreq:* DSIGN 354.

DSIGN 353 Design Theory V 1(1,0) Continued study of ideas and issues of architecture through the presentation of topics on theory, technology, and practice.

DSIGN 354 Design Theory VI 1(1,0) Continuation of DSIGN 353.

DSIGN 451 Design Studies VII 5(0,10) Studio work with adjunct seminar/lecture concerned with advanced architectural design problems. *Preq:* DSIGN 352. *Coreq:* DSIGN 453.

DSIGN 452 Design Studies VIII 5(0,10) Continuation of DSIGN 451. *Preq:* DSIGN 451. *Coreq:* DSIGN 454.

DSIGN 453 Design Theory VII 1(1,0) Study of advanced ideas and issues of architecture through the presentation of topics on theory, technology, and practice.

DSIGN 454 Design Theory VIII 1(1,0) Continuation of DSIGN 453.

ECONOMICS

Professors: D. K. Benjamin, D. W. Blair, W. R. Dougan, *Chair;* R. D. Elliott, C. M. Lindsay, R. E. McCormick, M. T. Maloney, R. D. Sauer, Jr., G. R. Thompson, M. S. Wallace, J. T. Warner; *Associate Professors:* D. B. Gordon, D. L. Placone, C. J. Simon, R. F. Tamura; *Assistant Professors:* J. K. Hakes, C. F. Thornberg

ECON 200 Economic Concepts 3(3,0) Comprehensive course including both micro- and macroeconomic concepts for students not having theoretical course requirement beyond the principles level or for students expecting to take a selected group of the 300-level courses in economics. Credit will not be given to students who previously have completed ECON 211 or 212.

ECON 211, H211 Principles of Microeconomics 3(3,0) Intensive study of the economics of the firm, pricing of resources, and international economic relations. Theory is given relevance through the analysis of current economic problems.

ECON 212, H212 Principles of Macroeconomics 3(3,0) Fundamental principles of price-level determination, stabilization, and growth in a modern economy. Topics include employment theory, monetary and fiscal policy, and economic growth. *Preq:* ECON 211 or consent of instructor.

ECON 301 Economics of Labor 3(3,0) Introduces students to the economics of the labor market and labor relations. Considers the theories of wages and employment, determination, unemployment, investment in human capital, discrimination, and public policy toward the labor market. Also considers the role of labor unions. Cannot be used to satisfy requirements for a degree in Economics. *Preq:* ECON 200 or 201 or 211.

ECON 302 Money and Banking 3(3,0) Considers the function of money and banking in both the product and financial markets. Special emphasis is placed on monetary theory and current problems of monetary policy. Cannot be used to satisfy requirements for a degree in Economics. *Preq:* ECON 200 or 211.

ECON (MGT) 306 Managerial Economics 3(3,0) Uses tools of economic analysis in classifying problems in organizing and evaluating information, and in comparing alternative courses of action. Bridges the gap between economic theory and managerial practices. Cannot be used to satisfy requirements for a degree in Economics. *Preq:* ECON 200 or 211.

ECON 307 Arbitration 3(3,0) Analysis of dispute settlement procedures with specific emphasis on mediation, fact-finding, and arbitration as they are used to resolve labor-management disputes in the public and private sectors. *Preq:* Consent of instructor.

ECON 308 Collective Bargaining 3(3,0) Practices, procedures, legal foundations, and legal structure associated with collective bargaining. Form and content of the labor contract, grievance machinery, and mediation and arbitration institutions are also studied. *Preq:* ECON 200 or 211.

ECON 309 Government and Business 3(3,0) Relationships between government and business, including, among other topics, government efforts to enforce competition; to regulate public utilities; and to protect the special interest of laborers, farmers, and consumers. *Preq:* ECON 200 or 211.

ECON 310 International Economy 3(3,0) Studies of the process of international commerce. Covers basic theory of trade and exchange rates, institutional and legal environment, current policy issues. Not open to students who have taken ECON 412. Cannot be used to satisfy requirements for a degree in Economics. *Preq:* ECON 200 or both 211 and 212, or consent of instructor.

ECON 314, H314 Intermediate Microeconomics 3(3,0) Analytical study of the basic concepts of value and distribution under alternative market conditions. *Preq:* ECON 211 or 200 and consent of instructor.

ECON 315, H315 Intermediate Macroeconomics 3(3,0) Macroeconomic problems of inflation and unemployment are the focal points. Statistics (measures of real output and the price level) and theory (covering the sources of short-run fluctuations and long-run growth) are included. Appropriate public policies addressing these issues are analyzed. *Preq:* ECON 200 or 212 or consent of instructor.

ECON 319 Environmental Economics 3(3,0) Study of the application of economic logic to issues surrounding environmental management and policy. Examines individual, firm, and collective decision making as well as the evolution of regulatory approaches for controlling environmental use. *Preq:* ECON 314.

ECON (E L E) 321 Economics of Innovation 3(3,0) Examines the nature of entrepreneurship and the contribution of innovation to economic growth. The organizational and institutional sources of innovation in different firms and different countries are investigated as well as the work of economic theorists concerning the role entrepreneurs play in bringing new products to market. *Preq:* ECON 306 or 314.

ECON 324 Economics and Sports 3(3,0) Economic analysis of sports teams, leagues, and institutions. Analysis of basic economic issues using sports data. *Preq:* Sophomore standing, ECON 211.

ECON 325 Personnel Economics 3(3,0) Studies the various compensation and personnel practices that firms employ. Explains when each of those practices should be followed to elicit the desired employee effort and labor force quality. Topics include piece-rate and time-rate systems, seniority-based incentive schemes, promotion contests, evaluation systems, mandatory retirement, and up-or-out rules. *Preq:* ECON 200 or 211.

ECON H390 Junior Honors Research 1(1,0) Readings and research in conjunction with an approved economics course at the 300 or 400 level. Honors status required. May be taken three times.

ECON 401 Labor Market Analysis 3(3,0) Develops the methods of economic analysis of labor markets. Requires students to apply these methods to problems of the labor market. Topics include labor demand and supply, human capital, occupational choice, compensating wage differentials, organizational wage structures and incentive systems, unemployment, and discrimination. *Preq:* ECON 314.

ECON 402 Law and Economics 3(3,0) Application of economics to the law of property, torts, and contracts; regulation of markets, business organizations, and financial transactions; distribution of income and wealth; and criminal law. *Preq:* ECON 211 or consent of instructor.

ECON 404 Comparative Economic Systems 3(3,0) Comparative analytical and historical study of the principal economic systems which have been important in the modern world including, among others, capitalism and socialism. *Preq:* ECON 314 or consent of instructor.

ECON 405, 605 Introduction to Econometrics 4(3,3) Elements of time series analysis and introduction to the measurement, specification, estimation, and interpretation of functional relationships through single equation least square techniques. Problems of multi-collinearity, dummy variables, heteroscedasticity, autocorrelation, and lagged variables in simple economic models are introduced. *Preq:* ECON 200 or 212; MTHSC 108 or 207; EX ST 301 or MTHSC 301.

ECON 410, 610 Economic Development 3(3,0) Consideration and analysis of economic and related problems of underdeveloped countries. Attention is given to national and international programs designed to accelerate solution of these problems. *Preq:* ECON 314 or consent of instructor.

ECON 412 International Microeconomics 3(3,0) Analysis of the essential aspects of international economic linkages. Gains and redistributive effects of trade and the barriers to trade are discussed within the context of a variety of economic models. The history of trade policy and the political economy of its determination are also discussed. *Preq:* ECON 314 or consent of instructor.

ECON 413 International Macroeconomics 3(3,0) Examination of macroeconomic linkages between an individual country and the rest of the world and how these linkages are affected by the choice of exchange rate regimes. Topics include the relation between domestic and foreign interest rates and exchange rates and the ability to pursue independent monetary policies. *Preq:* ECON 315.

ECON 419 Economics of Defense 3(3,0) Examines the American defense establishment in terms of resources utilized, alternative uses, and the contribution to the national economy and scientific progress generated by resources in a defense use. Economic problems inherent in shifting resources between defense and nondefense uses and among alternative defense uses are discussed. *Preq:* ECON 314.

ECON 420 Public Sector Economics 3(3,0) Study of the role of government and its proper functions and limitations in a market. Provision of goods and services by all levels of government and instruments of taxation are evaluated according to efficiency and equity criteria. Contemporary public sector issues are emphasized throughout. *Preq:* ECON 314 or consent of instructor.

ECON 422 Monetary Economics 3(3,0) Intensive study of the role of monetary factors in economic change. Modern monetary theories and their empirical relevance for policy are developed against a background of monetary history and institutions. *Preq:* ECON 314 and 315 or consent of instructor.

ECON 424 Organization of Industries 3(3,0) [W.2] Empirical, historical, and theoretical analyses of market structure and concentration in American industry: the effects of oligopoly, monopoly, and cartelization upon price, output, and other policies of the firm; antitrust and other public policies and problems are studied. *Preq:* ECON 314 or consent of instructor.

ECON 430 Topics in Mathematical Economics 3(3,0) Skills acquired in freshman mathematics are applied to selected topics in economic theory. Course is a good complement to ECON 314 and provides excellent preparation for 400-level courses in economics, especially ECON 405. May be taken concurrently with ECON 314. *Preq:* ECON 314 and either MTHSC 108 or 207.

ECON H491 Senior Honors Thesis Research 3(3,0) Reading and research for the Senior Honors Thesis. *Preq:* ECON 314, 315, senior honors standing.

ECON H492 Senior Honors Thesis Writing 3(3,0) Writing and oral presentation of the Senior Honors Thesis. *Preq:* ECON H491.

ECON 496 Independent Study 1-3(1-3,0) Research and writing on a selected economics topic chosen by the student. A written proposal must be approved by the instructor prior to the start of the semester. May be repeated for a maximum of six credit hours. *Preq:* ECON 314.

ECON 498, H498 Selected Topics in Economics 3(3,0) In-depth treatment of topics not covered fully in regularly scheduled courses. Specific topics vary from year to year. May be repeated for a maximum of nine credits, but only if different topics are covered. *Preq:* ECON 314 and 315 or consent of instructor.

ECON 499 Senior Seminar in Economics 1-3(1-3,0) Discussion of topics of current interest in economics. Students do directed research on a particular topic. *Preq:* Consent of instructor.

EDUCATION

Professors: B. E. Bailey, A. D. Brooks, K. S. Headley, W. H. Leonard, J. F. Yukish; *Associate Professors:* P. J. Dunston, S. W. Fones, L. B. Hart, E. M. Owens, D. A. Smith, V. G. Ridgeway; *Assistant Professors:* M. E. Hall, R. M. Horton, R. A. Kaminski, S. S. Warner; *Lecturers:* J. K. Weir, N. S. Wilkinson; *Visiting Assistant Professor:* L. S. Brown, R. S. Brown

ED 100 Orientation 1(1,0) Lectures and discussions on teaching. For a minimum of ten weeks, students spend one hour per week in schools assisting teachers, observing, and tutoring individuals. Required of all students in Early Childhood, Elementary, and Secondary Education, Mathematics Teaching, and Science Teaching. To be taken Pass/Fail only.

ED 101 Reading Improvement 1(0,3) Provides an individualized approach to developmental reading skills emphasizing comprehension, vocabulary, and rate.

ED 102 Efficient Reading 1(0,3) Extends the reading skills of vocabulary, comprehension, and rate stressing skimming, scanning, flexibility, and critical reading.

ED 321 Physical Education Methods for Classroom Teachers 3(3,0) Provides education majors with a basic understanding of the methods and techniques utilized in teaching elementary physical education. Emphasis is placed on acquiring a basic understanding of the movement education approach and the ability to teach integrated lessons utilizing this approach.

ED 400 Early Childhood Education Field Experience 3(0,9) Practical classroom experience in early childhood education prior to the student teaching semester for Early Childhood Education majors. For a twelve-week period, students spend two hours per week in schools observing, tutoring, conducting small group activities, and teaching the class. To be taken Pass/Fail only. *Preq:* ED 100, ED F 334, 336; concurrent enrollment in ED 459, 483; senior standing; admission to the professional level.

ED 401 Elementary Field Experience 3(0,9) Practical classroom experience prior to the student teaching semester for Elementary Education majors. For a twelve-week period, students spend two hours per week in schools observing, tutoring individuals, conducting small group activities, and teaching the class. To be taken Pass/Fail only. *Preq:* ED 100, ED F 334; concurrent enrollment in ED 460, 488; admission to the professional level.

ED 405 Multicultural Issues 3(3,0) Introduces prospective teachers to multicultural frameworks in curriculum and instruction in the context of race, class, and gender identities. *Preq:* HIST 172 or 173; or permission of the instructor.

ED 412 Directed Student Teaching in Secondary School Subjects 12(1,33) Program of supervised observation and teaching in cooperation with selected public schools. Opportunities are provided for prospective teachers to obtain experiences in the subject area. Students are sectioned according to teaching fields: English, history, social science, mathematical sciences, modern languages, science. Enrollment is limited.

ED 417 Teaching Internship in the Secondary School 6(1,15) Full-time, supervised teaching internship for one semester in cooperation with a participating South Carolina secondary school. Reserved for students seeking certification in critical-need teaching areas. May be repeated for a maximum of 12 credits. To be taken Pass/Fail only. *Preq:* ED F 301, 302, 335, ED 498, and one of the following: ED 424, 425, 426, 427. Application approved by the School of Education.

ED 424 Teaching Secondary English 3(2,2)F Development of instructional practices and materials appropriate for secondary English; familiarization with curriculum materials; includes field experiences in local schools in preparation for student teaching. *Preq:* Second semester junior standing, admission to the professional level, ED 100, ED F 301, 302, 335, at least 18 hours of English coursework, concurrent enrollment in ED 498, minimum grade-point ratio of 2.5.

ED 425 Teaching Secondary Modern Languages 3(2,2)F Development of instructional practices and materials appropriate for secondary modern languages; familiarization with curriculum materials; includes field experiences in local schools. *Preq:* Second semester junior standing, admission to the professional level, ED 100, ED F 301, 302, 335, 18 hours of modern language coursework, concurrent enrollment in ED 498, minimum grade-point ratio of 2.5.

ED 426 Teaching Secondary Mathematics 3(2,2)F Development of instructional practices and materials appropriate for secondary mathematics; familiarization with curriculum materials; includes field experiences in local schools. *Preq:* Second semester junior standing, admission to the professional level, ED 100, ED F 301, 302, 335, at least 18 hours of mathematics coursework, concurrent enrollment in ED 498, minimum grade-point ratio of 2.5

ED 427 Teaching Secondary Science 3(2,2)F Development of instructional practices and materials for teaching secondary school science (biological, earth, and physical sciences); familiarization with secondary science curriculum materials; includes field experiences in local schools. *Preq:* Second semester junior standing, admission to the professional level, ED 100, ED F 301, 302, 335, at least 18 hours of science coursework, concurrent enrollment in ED 498, minimum grade-point ratio of 2.5

ED 428, H428 Teaching Secondary Social Studies 3(2,2) Development of instructional practices and materials appropriate for secondary social studies; familiarization with curriculum materials; includes field experiences in local schools in preparation for student teaching. *Preq:* Second semester Junior standing, admission to the professional level, ED 100, ED F 301, 302, 335, at least 18 hours of social studies coursework, concurrent enrollment in ED 498, minimum grade-point ratio of 2.5.

ED 435, 635 Special Institute Course: Curriculum 1-3(1-3,0) Subject areas organized according to institute needs. May be repeated for credit, but only if different topics are covered.

ED 437, 637 Technology in Secondary Mathematics 3(3,0) Students learn how to integrate calculators, data collectors, and computers in the secondary mathematics curriculum. They solve problems from middle school, Algebra I, Geometry, and Algebra II courses. *Preq:* Second semester junior standing, admission to the professional level.

ED 438 Selected Topics in Education 1-3(1-3,0) Specific education topics not found in other courses are selected for in-depth study. May be repeated for a maximum of six credits, but only if different topics are covered.

ED 439 Independent Study in Education 1-3(1-3,0) Study of selected topics in education under the direction of a faculty member chosen by the student. Student and faculty member develop a course of study different from any existing courses and designed for the individual student. May be repeated for a maximum of six credits, but only if different topics are covered.

ED 440, 640 Advanced Physical Education Methods for the Classroom Teacher 3(3,0) Helps experienced teachers in public schools expand their knowledge and understanding of physical education. *Preq:* ED 321 or equivalent, minimum grade-point ratio of 2.0.

ED 441, 641 Middle School Curriculum 3(3,0) Concepts and methods for teaching middle school students. Discusses nature of middle school students, teacher characteristics, curricular and co-curricular programs, organization, and teaching.

ED 451 Elementary Methods in Science Teaching 3(3,0) Development of process skills, technical skills, and attitudes needed to foster increased confidence and commitment to the teaching of elementary science, with emphasis on teaching strategies and techniques and their implications for what we know of how children learn science. *Preq:* PH SC 107, 108; BIOL 109; concurrent enrollment in ED 401, 460, 487, 488 (for Elementary majors); admission to the professional level.

ED 452 Elementary Methods in Mathematics Teaching 3(3,0) Special emphasis is given the development of understanding, skills, and attitudes in the elementary curriculum with focus on strategies, techniques, and materials for teaching elementary mathematics. *Preq:* General Education math requirement; admission to the professional level.

ED 466 Introduction to Early Childhood Education 3(3,0) Introductory course for Early Childhood Education, which includes an overview of curriculum for kindergarten and primary grades. *Preq:* ED F 336 or concurrent enrollment; admission to the professional level.

ED 481 Directed Teaching in the Elementary School 12(1,33) Supervised observation and teaching experiences in cooperation with selected elementary schools. Restricted to seniors or graduates who have completed prerequisite courses. *Preq:* ED 321, 401, 451, 452, 460, 487, 488; admission to the professional level, consent of area committee chair.

ED 483 Methods and Materials for Early Childhood Education 3(3,0) Study of methods and materials applicable to nursery schools, kindergarten, and early elementary grades. *Preq:* ED 466; concurrent enrollment in ED 321, 400, 459, 488; admission to the professional level.

ED 484 Directed Teaching in Early Childhood Education 12(1,33) Supervised observation and teaching experiences in cooperation with nursery, kindergartens, and early elementary schools. Restricted to seniors or graduates who have completed prerequisite courses and have the cumulative grade-point ratio for graduation. *Preq:* ED 321, 400, 459, 483, 488; admission to the professional level, consent of area committee chair.

ED 487 Teaching Social Studies in the Elementary School 3(3,0) Introduction for pre-service teachers to the skills of social studies and methods, materials, and techniques needed to teach these skills to students in the elementary school. *Preq:* HIST 172, 173; GEOG 101 or 103; concurrent enrollment in ED 401, 451, 460, 488 (for Elementary majors); admission to the professional level.

ED 488 Teaching the Language Arts in the Elementary School 3(3,0) [W.1] Introduction for pre-service teachers to the skills of the language arts other than reading and the methods, materials, and techniques needed to teach these skills to students in the elementary school. *Preq:* ENGL 102, 385; concurrent enrollment in ED 400, 459, 483 (for Early Childhood majors); concurrent enrollment in ED 401, 451, 460, 487 (for Elementary majors); admission to the professional level.

EDUCATIONAL COUNSELING

ED C 234 Introduction to Addictions: Basic Education and Prevention 3(3,0) Basic review of addictions and chemical dependence; gives future educators skills in the identification of chemical abuse, techniques for intervention, and methods of prevention education. SOC 396 and 397 are recommended as follow-up courses for those interested in pursuing the topic.

ED C 390 Student Development, Leadership, and Counseling for University Paraprofessionals 3(3,0) Introduction to theoretical and practical applications of student development and leadership on the university campus. Skills assisting students with leadership development, problem solving, conflict resolution, confrontation, and referral are developed. Legal and ethical issues for practitioners and learning effective utilization of resources available on the campus are explored.

EDUCATIONAL FOUNDATIONS

Professors: D. E. Barrett, W. R. Fisk, R. P. Green, Jr.; *Associate Professors:* G. C. Delicio, C. L. Peters, L. B. Reardon, D. M. Switzer, C. G. Weatherford; *Visiting Associate Professor:* L. J. Boyles

ED F 301, H301 Principles of American Education 3(3,0) Study of the legal basis, historical development, characteristics, and functions of educational institutions in the United States. *Preq:* Minimum grade-point ratio of 2.0.

ED F 302, H302 Educational Psychology 3(3,0) Introduction to classroom use of objectives, motivation theories, learning theories, tests and measurements, classroom management, and knowledge of exceptional learners. *Preq:* Minimum grade-point ratio of 2.0.

ED F (THRD) 315 Integrating Computers into the Classroom 1(0,2) Students learn how to use microcomputers to supplement the classroom curriculum and to enhance classroom management. *Preq:* Admission to a Teacher Education Program; ED F 301, 302; General Education computer skills requirement; minimum grade-point ratio of 2.0; or consent of instructor.

ED F 334, H334 Child Growth and Development 3(3,0) Introduction to lifespan development. Heavy emphasis is placed on the physical, social, emotional, and cognitive characteristics. Includes a minimum of five one-hour observation-participation visits to an elementary school. *Preq:* ED 100 or concurrent enrollment, minimum grade-point ratio of 2.0, or consent of instructor for non-education majors.

ED F 335, H335 Adolescent Growth and Development 3(3,0) Introduction to lifespan development. Emphasis is on the physical, social, emotional, and cognitive characteristics of the 10- to 18-year old and the educational implications of those developmental characteristics.

ED F 336, H336 Behavior of the Preschool Child 3(3,0) Study of the behavior of the preschool child from infancy through age five. Theoretical concepts and observation of children's behavior are integrated, analyzed, and evaluated to discover implications for teaching and guiding preschool children. Includes a minimum of 10 one-hour observation-participation visits in public kindergarten. *Preq:* ED F 334, minimum grade-point ratio of 2.0 or consent of instructor.

ED F 406 Philosophy, Schooling, and Educational Policy 3(3,0) Analysis of the development of contemporary educational theory and its impact on current schooling practices and educational policy development.

ED F (PRTM) 415, 615 Methods in Reducing Risks for Middle Childhood 3(2,3) Develops a knowledge base for professionals who work with at-risk children. Students work in a field setting to apply knowledge, develop and practice skills, and cooperate with professionals from various disciplines. *Preq:* Junior standing.

ED F 458 Health Education 3(3,0) [W.1] Study of the information needed for effective cooperation with parents, physicians, and public health agencies in the promotion and improvement of community health, including problems of personal hygiene, health records, immunization, and control of communicable disease. *Preq:* Minimum grade-point ratio of 2.0.

ED F (AG ED, THRD) 480, 680 Educational Applications of Microcomputers 3(2,2) [C.3] Fundamentals of computer applications for teachers. Develops competencies in general computer applications such as word processing and database management and addresses educational uses of the Internet and computer-assisted instruction, with emphasis on legal and ethical issues and the impact of computer technology upon society. *Preq:* Admission to a Teacher Education Program.

ED F (AG ED, THRD) 482, 682 Advanced Educational Applications of Microcomputers 3(2,2) Provides students with the knowledge and skills needed to apply microcomputer technology to the utilization and generation of educational software in accordance with sound educational principles. *Preq:* ED F (AG ED, THRD) 480.

ED F 490, 690 Student Management and Discipline 3(3,0) Aids pre-service and in-service teacher development and refines knowledge, skills, and values important for managing students in school settings. Practical application of theory and research and legal and ethical considerations are emphasized. *Preq:* ED F 302 or PSYCH 201; ED F 334, 335, or suitable alternative; minimum grade-point ratio of 2.0.

ED F 497, 697 Instructional Media in the Classroom 3(3,0) Integrated approach to the use of audiovisual media stressing systematic planning, selection, utilization, and evaluation as well as production of materials and equipment operation. *Preq:* Minimum grade-point ratio of 2.0.

ELECTRICAL AND COMPUTER ENGINEERING

Professors: C. M. Butler, D. M. Dawson, T. L. Drake, D. J. Dumin, A. A. Girgis, J. N. Gowdy, *Chair;* J. W. Harrison, Jr., J. J. Komo, J. Y. Luh, E. B. Makram, L. W. Pearson, K. F. Poole, M. B. Pursley, R. J. Schalkoff, R. Singh; *Associate Professors:* C. W. Baum, E. G. Baxa, Jr., M. A. Bridgwood, E. R. Collins, Jr., W. B. Ligon III, A. Q. Martin, I. D. Walker, X.-B. Xu; *Assistant Professors:* W. R. Harrell, A. W. Hoover, D. L. Noneaker, A. V. Pham, H. B. Russell, R. R. Sass, D. C. Stanzione, Jr., *Research Associate*; *Visiting Assistant Professors:* S. J. Hubbard, W. B. Reid III

E C E 201 Logic and Computing Devices 3(2,2) Study of logic with an introduction to Boolean algebra; number systems and representation of information; use of integrated circuits to implement combinational and sequential logic functions and computing elements; organization and structure of computing systems. *Preq:* MTHSC 108, PHYS 122.

E C E 202, H202 Electric Circuits I 3(3,0) DC resistive circuits, Kirchhoff's Laws, Nodal and Mesh emphasis, sources, Thevenin's and Norton's theorems, RC, RL, RCL circuit solutions with initial condition using homogenous or nonhomogenous ordinary differential equations having constant coefficients. Develop sinusoidal steady state solution. *Preq:* MTHSC 108, PHYS 122. *Coreq:* E C E 211, PHYS 221.

E C E 204 Circuit Analysis Problems I 1(0,3) Analysis and solution of electrical network problems using mesh and nodal analysis, Thevenin's and Norton's theorems and equivalent circuits and other circuit analysis from E C E 202. *Coreq:* E C E 202.

E C E 211 Electrical Engineering Laboratory I 1(0,2) Principles of measurement and instruments used to measure parameters and dynamic variables in electric circuits, steady state and transient measurements in DC and AC circuits, and data anyalysis methods are included. *Coreq:* E C E 202.

E C E 212 Electrical Engineering Laboratory II 1(0,2) Measurement techniques in AC steady-state circuits and comparison to theoretical predictions are emphasized. Two-port network methodology and transfer functions are studied experimentally and related to analysis using transform techniques. *Preq:* E C E 202, 211. *Coreq:* E C E 262.

E C E 262, H262 Electric Circuits II 3(3,0) Continuation of the study of electric circuits, including three-phase circuits, complex frequency and network functions, frequency response, two-port parameters, magnetically-coupled circuits, Laplace transforms, and introduction to Fourier series and transforms. *Preq:* E C E 202, MTHSC 206, PHYS 221. *Coreq:* E C E 212, MTHSC 208.

E C E 263 Circuit Analysis Problems II 1(0,3) Analysis of basic AC circuit analysis techniques to analyze the transient and steady-state behavior of both simple and complex circuits. *Coreq:* E C E 262, MTHSC 208.

E C E 272 Computer Organization 4(3,2) Introductory course in computer organization and architecture. Topics include basic hardware and software structure, addressing methods, programs control, processing units, I-O organization, arithmetic, main-memory organization, peripherals, microprocessor families, RISC architectures, and multiprocessors. *Preq:* E C E 201 and CP SC 101 or 111 or 157 or 210.

E C E H300 Junior Honors Seminar 1(2,0) Acquaints students enrolled in the Departmental Honors Program with current research activities in the Department. Faculty provide seminars where research interests are summarized. Seminars are planned to prepare students in choosing a research topic for their senior theses.

E C E 307 Basic Electrical Engineering 2(2,0) A first course in electrical engineering to provide non-Electrical Engineering majors with a knowledge of DC and AC circuit theory, AC power distribution, and numerous electrical devices, apparatus, and digital systems. *Preq:* MTHSC 206, PHYS 221. *Coreq:* E C E 309.

E C E 308 Electronics and Electromechanics 2(2,0) Continuation of E C E 307. Energy conversion systems are considered, as well as basic electronics. *Preq:* E C E 307.

E C E 309 Electrical Engineering Laboratory I 1(0,2) Laboratory to accompany E C E 307. Basic electrical circuits and instrumentation. *Coreq:* E C E 307.

E C E 311 Electrical Engineering Laboratory III 1(0,2) [W.1] Measurements and characteristics of electronic devices and circuits; use of manual and automated instruments to acquire data; oral and written engineering reports. *Preq:* E C E 262, MTHSC 208, PHYS 221. *Coreq:* E C E 320.

E C E 312 Electrical Engineering Laboratory IV 1(0,2) [W.1] Design and characterization of functional circuits using solid-state devices; use of manual and automated instruments for measurements; statistical analysis of data; and preparation of engineering reports. *Preq:* E C E 311, 320. *Coreq:* E C E 321.

E C E 317 Random Signal Analysis 3(3,0) Introduction to engineering problems of a probabilistic nature. Systems transformations, statistical averages, simulation, and estimation of system parameters. *Preq:* E C E 262, MTHSC 208. *Coreq:* E C E 330.

E C E 320 Electronics I 3(3,0) [O.1] Introduction to electronic materials and devices; principles of design; design of DC and AC circuits using diodes, bipolar junction transistors, field-effect transistors and use of transistors in digital circuits. *Preq:* E C E 262, MTHSC 208, PHYS 221. *Coreq:* E C E 311.

E C E 321 Electronics II 3(3,0) Analysis and design of discrete amplifier circuits at low and high frequencies; operational amplifiers, distortion in amplifiers, oscillator design, and circuit analysis of active digital devices. *Preq:* E C E 320. *Coreq:* E C E 312.

E C E 329 Computer Systems Structures 3(3,0) Fundamental structures and issues that arise in the analysis and implementation of computer systems. Topics include operating systems structures and data structures and their relationship to computer organization. Engineering science background for computer systems design. *Preq:* CP SC 102 or 210 or 211; CP SC 340 or 212; E C E 272.

E C E 330, H330 Signals, Systems, and Transforms 3(3,0) Systems models, analysis of signals, Fourier series and transforms, sampling and Z transforms, discrete Fourier transforms. *Preq:* E C E 262, MTHSC 208.

E C E 352 Programming Systems 3(3,0) Second course in programming languages and systems. Topics include assemblers, compilers, and syntactical methods; string manipulation and list processing; concepts of executive programs and operating systems; introduction to time-sharing systems. *Preq:* CP SC 340 or 212 and MTHSC 419.

E C E 360 Electric Power Engineering 3(3,0) Presents the basic principles of electromagnetic induction and electromagnetic forces developed. Topics include synchronous machines, power transformers, electric power transmission, and distribution systems, DC motors, and induction motors. *Preq:* E C E 262, PHYS 221.

E C E 371 Microcomputer Interfacing 4(1-3,1-3) **[W.1]** Interfacing of microcomputers to peripherals or other computers for purposes of data acquisition, device monitoring and control, and other communications. The interfacing problem is considered at all levels including computer architecture, logic, timing, loading, protocols, and software laboratory for building and simulating designs. *Preq:* E C E 262, 272. *Coreq:* E C E 320.

E C E 380 Electromagnetics 3(3,0) Introduction to electric fields and potentials, dielectrics, capacitance, resistance, magnetic field, forces, work and energy, inductance, time-varying fields, and Maxwell's equations. *Preq:* E C E 262, PHYS 221, MTHSC 206.

E C E 381 Fields, Waves, and Circuits 3(3,0) Foundation of circuit theory, transmission lines and circuits, plane-wave propagation, fiber optics, radiation and antennas, coupled circuits. *Preq:* E C E 380, MTHSC 208.

E C E 404, 604 Semiconductor Devices 3(3,0) Consideration of the principles of operation, external characteristics, and applications of some of the more important semiconductor devices presently available. *Preq:* E C E 320. *Coreq:* MTHSC 311 or 434.

E C E 405 Design Projects in Electrical and Computer Engineering 1-3(0,2-6) Individually defined projects oriented toward providing experience in establishment of objectives and criteria, synthesis, analysis, construction, testing, and evaluation; development of student creativity through the solution of open-ended problems; individual instruction in design methodology. Maximum of three credit hours. *Preq:* E C E 302 or 330 or 409, consent of project supervisor.

E C E 406, 606 Introduction to Microelectronics Processing 3(3,0) Microelectronic processing, MOS and bipolar monolithic circuit fabrication, thick and thin film hybrid fabrication, applications to linear and digital circuits, fundamentals of device design. *Preq:* E C E 320. *Coreq:* MTHSC 311 or 434.

E C E 409 Continuous and Discrete Systems Design 3(3,0) Introduction to classical linear control systems. Topics include continuous and discrete descriptions of systems, time and frequency response, stability, system specification, system design of continuous and discrete systems. *Preq:* E C E 330. *Coreq:* E C E 495.

E C E 410, 610 Modern Control Theory 3(3,0) Introduction to modern control theory. Topics include fundamentals of matrix algebra, state space analysis and design, nonlinear systems and optimal control. *Preq:* E C E 409.

E C E 412 Electrical Machines Laboratory 1(0,2) Selected experiments to familiarize students with characteristics of transformers, DC and AC motors and generators. Measurement techniques and component modeling are included. *Coreq:* MTHSC 434 or consent of instructor. *Preq or Coreq:* E C E 360 or 419.

E C E 417, 617 Elements of Software Engineering 3(3,0) **[W.1]** Foundations of software design, reasoning about software, the calculus of programs, survey of formal specification techniques and design languages. *Preq:* E C E 329, 352, MTHSC 419.

E C E 418, 618 Power System Analysis 3(3,0) Study of power system planning and operational problems. Subjects covered are load flow, economic dispatch, fault studies, transient stability, and control of problems. System modeling and computer solutions are emphasized through class projects. *Preq:* E C E 360, 380.

E C E 419, 619 Electric Machines and Drives 3(3,0) Performance, characteristics, and modeling of AC and DC machines during steady-state and transient conditions. Introduction to power electronics devices and their use in adjustable speed motor drives. *Preq:* E C E 321, 360, 380. *Coreq:* MTHSC 434 or consent of instructor.

E C E 422, 622 Electronic System Design I 3(2,2) Emphasizes the application of theory and skills to the design, building, and testing of an electronic system with both analog and digital components. Application varies each semester. Extensive use is made of computer software tools in the design process. *Preq:* E C E 321, 330, 360, 371, 381.

E C E 426, 626 Digital Computer Design 3(3,0) Design of high-speed ALUs, control and timing circuitry, memory systems and I/O circuitry; microprogrammed computer design using bit-slice microprocessors; current hardware topics related to computer design; hands-on design experience; and use of logic analyzer for system debugging. *Preq:* E C E 371.

E C E 427 Communications Systems 3(3,0) Study of modulation techniques used in modern communications systems design, including continuous wave modulation (AM, FM, PM), analog and digital pulse modulation (PAM, PPM, PWM, PCM), and the impact of noise interference on these systems. *Preq:* E C E 317, 330. *Coreq:* MTHSC 434.

E C E 429, 629 Organization of Computers 3(3,0) Computer organization and architecture. Topics incude a review of logic circuits, bus structures, memory organization, interrupt structures, arithmetic units, input-output structures, state generation, central processor organization, control function implementation, and data communication. Registered Transfer Language (RTL) for description and design of digital systems. *Preq:* CP SC 230 or E C E 250 or 272 or consent of instructor.

E C E 430, 630 Introduction to Digital Communications 3(3,0) Course in modern digital communications theory. Topics include discrete time signals, discrete Fourier transforms, channel bandwidth, channel distortion, coding of analog information, data signal encoding, introduction to decision theory, matched filter, baseband systems, AM, FM, PM, phase-locked loops, secure communications and contemporary communications systems. *Preq:* E C E 317 or MTHSC 400, E C E 330, MTHSC 311 or 434, or consent of instructor.

E C E 431, 631 Digital Electronics 3(2,2) Electronic devices and circuits of importance to digital computer operation and to other areas of electrical engineering are considered. Active and passive waveshaping, waveform generation, memory elements, switching, and logic circuits are some of the topics. Experimentation with various types of circuits is provided by laboratory projects. *Preq:* E C E 321. *Coreq:* MTHSC 311 or 434.

E C E 432, 632 Instrumentation 3(3,0) Theory and analysis of transducers and related circuits and instrumentation. Generalized configurations and performance characteristics of instruments are considered. Transducer devices for measuring physical parameters such as motion, force, torque, pressure, flow, and temperature are discussed. *Preq:* E C E 321. *Coreq:* MTHSC 311 or 434.

E C E 434, 634 Power Electronics 3(3,0) Study of electronic devices and systems which are designed to control or regulate large amounts of power. Included are SCR applications to inverters, motors controls, high-current switching systems, voltage stabilizers, and other power applications of electronics are also considered. *Preq:* E C E 321, 360. *Coreq:* MTHSC 434 or consent of instructor.

E C E 436, 636 Microwave Circuits 3(3,0) Analysis of microwave networks comprising transmission lines, waveguides, passive elements, interconnects, and active solid state microwave circuits. Use of modern CAD tools to design RF/Microwave passive/active networks. Fabrication of typical circuits. *Preq:* E C E 381 or equivalent. *Coreq:* MTHSC 311 or 434.

E C E 438, 638 Computer Communications 3(3,0) Digital data transmission techniques, modems and communications channels, communications software and protocols, multiprocessors and distributed processing; concurrency and cooperation of dispersed processors. *Preq:* Senior standing in Electrical or Computer Engineering or Computer Science or consent of instructor.

E C E 439, 639 Fiber Optics 3(3,0) The underlying principles of design for optical fibers in practical systems are covered. Optical fiber as a waveguide is examined using wave optics and ray optics. Design criteria for using mono- and multimode fibers are discussed. Other topics include fabrication, measurement. *Preq:* E C E 381. *Coreq:* MTHSC 434 or consent of instructor.

E C E 440, 640 Performance Analysis of Local Computer Networks 3(3,0) Introduction to the design and performance analysis of local computer networks. Emphasis is on performance analysis of representative multi-access procedures. Three common types of networks are considered in detail. *Preq:* E C E 272, 317 or MTHSC 400 or equivalent.

E C E 442, 642 Knowledge Engineering 3(3,0) Introduction to the theoretical and practical aspects of knowledge engineering or applied artificial intelligence. Topics include symbolic representation structures and manipulation, unification, production systems and structures, rule-based and expert systems, planning and AI system architectures; system design in PROLOG and LISP. Project is required. *Preq:* E C E 329, 352.

E C E 446, 646 Antennas and Propagation 3(3,0) Study of the theoretical and practical aspects of antenna design and utilization, input impedances, structural considerations, and wave propagation. *Preq:* E C E 330, 381 or 436, MTHSC 311 or 434.

E C E 453, 653 Software Practicum 3(1,6) Students design and implement a software system that satisfies both a requirements and specifications document. The resulting system is tested for compliance. *Preq:* E C E 329, 352.

E C E (M E) 456, 656 Fundamentals of Robotics 3(3,0) See M E 456.

E C E 459, 659 Integrated Circuit Design 3(2,2) Design concepts and factors influencing the choice of technology; fundamental MOS device design; silicon foundaries, custom and semicustom integrated circuits; computer-aided design software/hardware trends and future developments; hands-on use of CAD tools to design standard library cells; systems design considerations, testing, and packaging. *Preq:* E C E 321. *Coreq:* MTHSC 311 or 434.

E C E 460, 660 Computer-Aided Analysis and Design 3(3,0) Principles and methods suited to the solution of engineering problems on the digital computer. Topics include widely used methods for the solution of the systems of algebraic and/or differential equations which arise in modeling of engineering systems, data approximation and curve fitting, continuous system simulation languages, and design-oriented programming systems. *Preq:* E C E 262, MTHSC 311, 434, or consent of instructor.

E C E 467, 667 Introduction to Digital Signal Processing 3(3,0) Introduction to characteristics, design, and applications of discrete time systems; design of digital filters; introduction to the Fast Fourier Transform (FFT); LSI hardware for signal processing applications. *Preq:* E C E 330.

E C E 468, 668 Embedded Microprocessor 3(2,2) Interfacing, architecture, and design issues which arise when the microprocessor is embedded in electromechanical and human systems. Applications and design projects include guidance systems, robotics, process control, artificial limbs, etc. *Preq:* E C E 302 or 330 or 409 and 371, MTHSC 311 or 434 or consent of instructor.

E C E H491 Undergraduate Honors Research 1-6 Individual research projects conducted under the direct supervision and guidance of a faculty member. May be repeated for a maximum of six credits.

E C E 492, 692 Special Problems 1-3(0,2) Special assignment in electrical or computer engineering. Some typical assignments include computer programs, term papers, technical literature searches, hardware projects, and design project leadership. May be taken only once for credit.

E C E 493, 693 Selected Topics 1-3(1-3,0) Classroom study of current and new technical developments in electrical and computer engineering. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

E C E 495 Integrated System Design I 2(1,3) [O.1] Engineering design of systems is considered in a continuous process of project definition, planning, execution, and evaluation. This process includes consideration of both technical and nontechnical factors in design. Strong emphasis is placed on the development of effective technical communications skills, particularly oral communications competency. *Preq:* E C E 321, 330, 360, 371, 381 (three of which must have been completed prior to enrollment, with the remaining taken as corequisite courses). *Coreq:* E C E 409 (in addition to any deficit courses in the prerequisites).

E C E 496 Integrated System Design II 2(0,6) [O.1] Project-oriented course which brings together electrical engineering students of dissimilar training into teams or project groups. Group assignments are made which are designed to develop an appreciation for individual and creative thinking as well as team effort. *Preq:* E C E 321, 330, 360, 371, 381, 409, 495.

ENGINEERING

Professors: W. F. Beckwith, B. L. Sill, *Director*; *Associate Professor:* W. J. Park; *Assistant Professor:* M. W. Ohland

ENGR 101 Introduction to Engineering 1(0,2) Introduction to the engineering profession and engineering disciplines for the purpose of assisting students in their selection of an engineering major. Professional ethics, technical communications, word processing, and electronic communications are taught.

ENGR 110 Engineering Problems Workshop 1(0,2) Workshop devoted to the analysis and solution of engineering-oriented problems. Representative problems taken from the different fields of engineering are used to illustrate such analytical and problem-solving techniques as estimation and approximation, numerical aids to computation, and solutions by graphical methods.

ENGR 120, H120 Engineering Problem Solving and Design 3(1,4) [C.1] Methodology and practice of engineering problem solving and engineering design. Selected computer tools, teamwork, and communication modes are employed. Ethics, safety, economics, and environmental concerns are considered. *Preq:* ENGR 101, MTHSC 106. *Coreq:* PHYS 122.

ENGR 150 Introduction to Materials 1(1,0) Introduction to materials used in modern technology. Different materials (metals, ceramics, and polymers) and different forms (bulk, fibers, gels, thin films, etc.) are discussed in the context of their application to consumer products, structural composites, refractories, biomedical implants, and electronic and optical materials. *Preq:* Enrollment in General Engineering or consent of instructor.

ENGR 180, H180 Computers in Engineering 3(2,3) Introduction to the use of computers in engineering analysis, design, and communications. A high-level programming language and other software are used on microcomputers. *Preq:* Engineering major; knowledge of a computer language. *Coreq:* MTHSC 106.

ENGINEERING GRAPHICS

Lecturers: C. A. Balch, L. C. Cleveland, R. A. Emert

E G 208 Engineering Graphics with Computer Applications 3(2,3) Introduction of basic concepts in engineering graphics as a means of communication. Areas of study include theory of orthographic projections, descriptive modeling, and computer graphics. Credit toward a degree will be given for only one of E G 208 or 209. *Preq:* ENGR 180.

E G 209 Introduction to Engineering/Computer Graphics 2(1,3) [C.1] Introduction of basic graphical concepts needed for engineering application, including orthographic projections, descriptive modeling, and computer graphics. Credit toward a degree will be given for only one of E G 208 or 209. *Preq:* ENGR 120 or permission of instructor.

E G 412, 612 Interactive Computer Graphics 3(3,0) Graphics hardware and display technology; reduction and presentation of engineering data; techniques of geometrical transformations, perspective, and model manipulation; methodology of computer-aided design; application of higher-level software to engineering problems. *Preq:* E G 208 and MTHSC 208 or consent of instructor.

E G 490, 690 Special Topics in Engineering and Computer Graphics 1-3(1-3,0) Comprehensive study of any computer-aided topic in engineering graphics not covered in other courses. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

ENGINEERING MECHANICS

Professors: S. C. Anand, S. B. Biggers, R. H. Brown, J. M. Kennedy, E. H. Law; *Associate Professor:* P. F. Joseph; *Assistant Professors:* L. L. Thompson, J. D. Wood

E M 201, H201 Engineering Mechanics: Statics 3(3,0) Forces and force systems and their external effect on bodies, principally the condition of equilibrium. The techniques of vector mathematics are employed, and the rigor of physical analysis is emphasized. *Preq:* PHYS 122, MTHSC 206 (or concurrent enrollment).

E M 202, H202 Engineering Mechanics: Dynamics 3(3,0) Continuation of E M 201. Principal topics are kinematics and kinetics of particles and rigid bodies of finite size. Techniques of vector mathematics are employed. *Preq:* E M 201, MTHSC 206.

E M 304, H304 Mechanics of Materials 3(3,0) The relationships between external loads on solid bodies or members and the resulting internal effects and dimension changes, including the derivation of rational formulas for stresses and deformations and the identification and use of important mechanical properties of engineering materials. *Preq:* E M 201, MTHSC 206.

E M 320, H320 Fluid Mechanics 3(3,0) Behavior of fluids at rest or in motion, including the study of fluid properties. Emphasis is on a rational, analytical approach from which are developed basic principles of broad applicability to all fields of engineering. *Preq:* E M 202, M E 203 or equivalent.

E M 425, 625 Advanced Strength of Materials 3(3,0) Topics in strength of materials not covered in E M 304. Three-dimensional stress and strain transformations, theories of failure, shear center, unsymmetrical bending, curved beams, and energy methods. Other topics such as stress concentrations and fatigue concepts are treated as time permits. *Preq:* E M 304.

E M 430, 630 Mechanics of Composite Materials 3(3,0) Fundamental relationships for predicting the mechanical and thermal response of multi-layered materials and structures are developed. Micromechanical and macromechanical relationships are developed for laminated materials with emphasis on continuous filament composites. The unique nature of composites and the advantages of designing with composites are discussed. *Preq:* E M 304.

E M 450, 650 Mechanical Vibrations 3(3,0) Mathematical analysis of physical problems in the vibration of mechanical systems. Topics include linear-free vibrations, forced vibrations, and damping in single degree of freedom systems, transient vibrations, critical speeds and whirling of rotating shafts, dynamic balancing, and multi-degree of freedom systems with lumped parameters. *Preq:* E M 202, 304, MTHSC 208.

ENGLISH

Professors: R. E. Barfield, H. B. Bryant, W. K. Chapman, F. L. Day, S. K. Eisiminger, M. J. Jacobi, *Chair;* G. W. Koon, R. B. Palmer, L. W. Rollin, F. W. Shilstone, D. C. Tillinghast, D. H. Winchell, M. R. Winchell, C. H. Woodell, K. B. Yancey, A. P. Young; *Associate Professors:* A. Bennett, M. J. Charney, B. Daniell, S. J. Hilligoss, T. W. Howard, L. W. Morrissey, E. K. Sparks; *Assistant Professors:* S. M. Ashton, J. J. Bausser, C. B. Boese, B. A. Clarke, J. I. Green, B. A. Heifferon, C. M.Keathley, B. C. Longo, M. H. Martin, S. L. O'Sullivan, C. E. Paul, K. L. Schiff, S. L. Smith, S. D. Williams; *Instructors:* L. R. Brown-Pressley, C. B. Greene, P. M. Harrison, B. D. Hatley, J. B. Lark, K. L. Morris, S. I. Patel; *Lecturers:* J. M. Bailey, J. R. Bates, J. M. Berry, M. L. Case, J. Conway, W. E. Felder, D. P. Galvin, L. A. Garren, K. H. Gentry, L. D. Hartman, W. H. Heath, K. H. Hester, P. L. Kanet, D. L. McMahand, C. L. MacPhee, J. M. Manson, R. O. Moffat, T. S. Peagler, E. M. A. Pourroy-Braud, B. J. Ramirez, B. D. Slattery, T. P. Smith, W. A. Stanton, T. R. Tichelaar, S. E. Titus, L. T. Vasseur, M. L. Walker; *Visiting Professor:* C. Selfe; *Visiting Associate Professor:* B. Agostini; *Visiting Assistant Professor:* R. J. Selfe, Jr.

ENGL 101, H101 Composition I 3(3,0) Training in correct and effective expression in brief expository essays; review of the fundamentals of grammar and punctuation; instruction in common expository methods.

ENGL 102, H102 Composition II 3(3,0) Continued emphasis on correct and effective expression; training in the organization and writing of the research report. *Preq:* ENGL 101.

ENGL 111 English as a Second Language 3(3,2) Special course for students learning English as a second language. Intensive study and drill in American English pronunciation and listening comprehension. Required of all foreign students who do not make a satisfactory grade on screening examination in oral English. To be taken Pass/Fail only. Carries no credit for graduation.

ENGL 190 The Study of English 1(1,0) Orientation to the study of English language and literature and to the sources and methods of literary research. Required of all English majors and recommended for minors.

ENGL 202, H202 The Major Forms of Literature 3(3,0) Study of the basic structures and elements of fiction, poetry, and drama, including literary and critical theory, with readings in American, British, and world literature. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 203, H203 Survey of English Literature I 3(3,0) Chief British authors and works from Beowulf to the Romantic period. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 204, H204 Survey of English Literature II 3(3,0) Chief British authors and works from the Romantic period to 1945. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 205, H205 Survey of American Literature I 3(3,0) American literature to the Civil War, with emphasis on major writers. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 206, H206 Survey of American Literature II 3(3,0) American literature from the Civil War to 1945, with emphasis on major writers. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 207, H207 Survey of World Literature I 3(3,0) Translations of continental European literature from Homer to the Renaissance (together with some Asian classics), with emphasis on major authors. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 208, H208 Survey of World Literature II 3(3,0) Translations of continental European literature from the 17th century to the present (together with some Asian classics), with emphasis on major writers. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 209, H209 Contemporary Literature 3(3,0) Study of selected writers since 1945, primarily British and American. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL H210 Introduction to Literary Study 3(3,0) Literature and composition course for honors students who have exempted ENGL 101 and 102. Readings in American, English, and world literature and advanced training in writing and research. *Preq:* Exemption from ENGL 101 and 102 or consent of instructor.

ENGL 211 Introduction to the Writing and Publication Studies Major 3(3,0) Introduces the Writing and Publication Studies major and provides an overview of courses, possible writing interests within the major, and career possibilities. Students gain an understanding of the importance of theory, close reading, textual analysis, and research methodologies. Faculty representating various writing specialties present to students. *Preq:* ENGL 102.

ENGL 217 Vocabulary Building 3(3,0) Development of a useful discriminating vocabulary for writing, speaking, and reading. Student notebooks and proficiency quizzes. *Preq:* ENGL 102.

ENGL 231 Introduction to Journalism 3(3,0) Instruction and practice in writing for mass media; editorial responsibilities. *Preq:* ENGL 102.

ENGL 265 Introduction to Editing 3(3,0) Introduction to the practice of editing texts. Includes instruction in the principles and symbols of copyediting and proofreading as well as work with electronic editing tools. Also addresses editor's role in different types of editing, including copy-editing, comprehensive editing, and developmental editing for both paper and electronic publication.

ENGL (G W) 301 Great Books of the Western World 3(3,0) See G W 301.

ENGL 304 Business Writing 3(3,0) [W.3] Introduction to business writing: memoranda, letters, reports, research methods. *Preq:* Junior standing.

ENGL 312 Advanced Expository Writing 3(3,0) [W.3] Workshop in practical writing focusing on principles and style. *Preq:* Sophomore literature or consent of instructor.

ENGL 314, H314 Technical Writing 3(3,0) [W.3] Intensive training in the fundamentals of technical writing: reports, letters, and memoranda. *Preq:* Junior standing.

ENGL 316 Writing and International Trade 3(3,0) [W.3] Students complete projects demanding a variety of communications skills that professionals in international trade need; sensitivity to foreign audiences and cultures in oral and written communication, electronic and graphic communication, collaborative writing and management. *Preq:* Sophomore literature.

ENGL 330 Approaches to Technical Communication 3(3,0) Overview of major conceptual and theoretical approaches to technical communication. *Preq:* ENGL 211.

ENGL 331 Publications Workshop 1(1,0) Workshop designed for students who serve on student publication staffs. Emphasizes the responsibilities of staff members. May be repeated for a maximum of three credits. *Preq:* ENGL 102, consent of the instructor.

ENGL 332 Visual Communication 3(3,0) Hands-on survey of visual communication theories and practices used by technical communicators in business and industry environments. Class meets regularly in computer classrooms. *Preq:* Sophomore literature; ENGL 211 or permission of instructor.

ENGL 333 Reporting for the News Media 3(3,0) [W.3] Practical experience in gathering and writing news and feature copy for the media, concentrating on print journalism; examination of the role of the modern journalist; laws governing the profession; journalistic ethics. *Preq:* ENGL 231 or consent of instructor.

ENGL 334 Feature Writing 3(3,0) [W.3] Practical experience in writing feature articles for newspapers, magazines, and free-lance markets. *Preq:* ENGL 231 or consent of instructor.

ENGL 335 Editing for Newspapers 3(3,0) Examination of the editing process of newspapers and magazines. Practical experience in article selection, copy-editing, headline writing, and page design. *Preq:* ENGL 231 or consent of instructor.

ENGL 345 The Structure of Fiction 3(3,0) [W.3] Introduction to the creative writing and critical study of prose fiction. *Preq:* Sophomore literature or consent of instructor.

ENGL 346 The Structure of Poetry 3(3,0) [W.3] Introduction to the creative writing and critical study of poetry. *Preq:* Sophomore literature or consent of instructor.

ENGL (THEA) 347 The Structure of Drama 3(3,0) See THEA 347.

ENGL 348 The Structure of the Screenplay 3(3,0) Introduction to the creative writing and critical study of the screenplay. Screenplays vary from semester to semester. May be repeated once for credit with consent of instructor. *Preq:* ENGL 357 or consent of instructor.

ENGL 350 Mythology 3(3,0) Study of the great myths of the world with an emphasis on their applications to literature. *Preq:* Sophomore standing.

ENGL 351 American Folklore 3(3,0) Study of American folklore with an emphasis on such considerations as the folktale, folk songs and ballads, folk heroes, and folk superstitions and remedies. *Preq:* Sophomore standing.

ENGL 353 Ethnic American Literature 3(3,0) Critical examination of essays, poetry, fiction, and drama written by members of a variety of American racial and ethnic groups, such as Native Americans, African-Americans, Chicano/Mexican Americans, Asian Americans, Italian Americans, and American Jews. *Preq:* Sophomore standing.

ENGL 355 Popular Culture 3(3,0) Examination of the nature, functions, history, and impact upon American society of best sellers, popular magazines, television, movies, and other like phenomena. *Preq:* Sophomore standing.

ENGL 356 Science Fiction 3(3,0) Readings in science fiction from the 17th century to the present, with special emphasis on writers since Verne and Wells. *Preq:* Sophomore standing.

ENGL 357 Film 3(2,3) Examination of the film medium as an art form: its history, how films are made, why certain types of films (western, horror movies, etc.) have become popular, and how critical theories provide standards for judging film. *Preq:* Sophomore standing or consent of instructor.

ENGL 358 Advanced Studies in Film 3(2,3) Continued study of film theory and aesthetics, with applications of that knowledge to the making of a film or video. *Preq:* ENGL 357 or consent of instructor.

ENGL 359 Special Topics in Language, Literature, or Culture 3(3,0) Studies in varied topics not central to other English courses, such as Literature and Art/Business/Sports; Language and Style; Black Literature. Specific titles and course descriptions to be announced from semester to semester. May be repeated once with department chair's consent. *Preq:* Sophomore literature or consent of instructor.

ENGL H367 Special Topics for Honors Students 3(3,0) Varied topics of general interest in literature, language, rhetoric, or culture for all honors students. Specific topics announced from semester to semester. May be repeated for a maximum of nine credits. *Preq:* Sophomore literature.

ENGL 380 British and American Women Writers 3(3,0) Poetry, drama, fiction, and prose by established and little-known women writers in Britain and America. Particular attention to works treating themes and issues concerning women's lives. Readings on such topics as women and work, education, religion, creativity. *Preq:* Sophomore standing.

ENGL 385 Children's Literature 3(3,0) Reading and analysis in a wide range of authors, illustrators, and genres appropriate for children from preschool through eighth grade, classic as well as modern. Critical approaches include historical, thematic, and social. *Preq:* Sophomore standing.

ENGL 386 Adolescent Literature 3(3,0) [W.1] Reading and analysis of literature written for readers age 12–18. Emphasis on historical context, chief themes and motifs, and censorship issues, as well as connections with classic literature. *Preq:* Sophomore standing.

ENGL 387 Book History 3(3,0) Examines the material and theoretical constructions of the book. Covers both historical and contemporary dimensions of dissemination, reception, artistry, and influence of books. *Preq:* ENGL 102.

ENGL 400, 600 The English Language 3(3,0) Studies in English usage and historical development of the language. *Preq:* Sophomore literature.

ENGL 401, 601 Grammar Survey 3(3,0) Survey of modern grammars with a focus on exploring the impact structural grammar has had on traditional grammar. Recommended for English teachers. *Preq:* Sophomore literature.

ENGL 403, 603 The Classics in Translation 3(3,0) Examination of Homer's *Iliad* and *Odyssey*, Virgil's *Aeneid*, and Ovid's *Metamorphoses*. A few shorter works by other Greek and Roman writers may also be read. *Preq:* Sophomore literature.

ENGL 404, 604 Classical Drama 3(3,0) Selected reading in the dramatic literature of classical Greece and Rome. *Preq:* Sophomore literature.

ENGL 405, 605 Studies in English Literature to 1700 3(3,0) Selected reading in English literature from the beginnings to 1700, with emphasis on social and intellectual backgrounds. *Preq:* Sophomore literature.

ENGL 406, 606 Studies in English Literature Since 1700 3(3,0) Selected readings in English literature from 1700 to the present, with emphasis on social and intellectual backgrounds. *Preq:* Sophomore literature.

ENGL 407, 607 The Medieval Period 3(3,0) Selected works of Old and Middle English literature, exclusive of Chaucer. *Preq:* Sophomore literature.

ENGL 408, 608 Chaucer 3(3,0) Selected readings in Middle English from *The Canterbury Tales* and other works by Chaucer. *Preq:* Sophomore literature.

ENGL 409, 609 The Earlier English Renaissance 3(3,0) Tudor and Elizabethan poetry, prose, fiction, translations, essays, and criticism. *Preq:* Sophomore literature.

ENGL 410, 610 Drama of English Renaissance 3(3,0) Selected readings in non-Shakespearean dramatic literature of the 16th and 17th centuries. *Preq:* Sophomore literature.

ENGL 411, 611 Shakespeare 3(3,0) Study of selected tragedies, comedies, and history plays of Shakespeare. Required of all English majors. *Preq:* Sophomore literature.

ENGL 412, 612 Studies in Shakespeare 3(3,0) Special topics in Shakespeare as selected by instructors. May be repeated once with department chair's consent. *Preq:* Sophomore literature.

ENGL 413, 613 Later English Renaissance 3(3,0) Nondramatic poetry and prose from Ben Jonson, John Donne, and Francis Bacon through Andrew Marvell and John Bunyan, excluding Shakespeare and Milton. *Preq:* Sophomore literature.

ENGL 414, 614 Milton 3(3,0) Development of Milton's art and thought from the minor poems and selected prose through *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*, set against the background of the late Renaissance. *Preq:* Sophomore literature.

ENGL 415, 615 The Restoration and Eighteenth Century 3(3,0) Readings in Dryden, Swift, Pope, and Dr. Johnson. *Preq:* Sophomore literature.

ENGL 416, 616 The Romantic Period 3(3,0) Readings from the poetry and critical prose of Blake, Wordsworth, Coleridge, Byron, Shelley, Keats, and other representative figures. *Preq:* Sophomore literature.

ENGL 417, 617 The Victorian Period 3(3,0) Reading from the poetry and nonfiction prose of selected Victorian authors, including works of Carlyle, Tennyson, Browning, Arnold, and other representative figures. *Preq:* Sophomore literature.

ENGL 418, 618 The English Novel 3(3,0) Study of the English novel from its 18th century beginnings through the Victorian Period. *Preq:* Sophomore literature.

ENGL 422, 622 American Literature I 3(3,0) Major American authors and movements from the Colonial period to the Civil War. *Preq:* Sophomore literature.

ENGL 423, 623 American Literature II 3(3,0) Major American authors and movements from the Civil War to the early 20th century. *Preq:* Sophomore literature.

ENGL 424, 624 American Literature III 3(3,0) Major American authors and movements of the 20th century. *Preq:* Sophomore literature.

ENGL 425, 625 The American Novel 3(3,0) Survey of the most significant forms and themes of the American novel from its beginnings to 1900. *Preq:* Sophomore literature.

ENGL 426, 626 Southern Literature 3(3,0) Intellectual and literary achievement of the South from 1607 to the present, with emphasis on the writers of the 19th century. *Preq:* Sophomore literature.

ENGL 427, 627 Agrarianism and the Humanistic Tradition 3(3,0) Focuses on the importance of agriculture and rural life to the humanistic tradition of Western Civilization from antiquity through the early years of the American republic. *Preq:* Sophomore literature.

ENGL 430, 630 Modern Drama 3(3,0) Principles and progress of drama from Ibsen to the present; analysis of representative plays; critical reports; discussion of trends in contemporary drama. *Preq:* Sophomore literature.

ENGL 431, 631 Modern Poetry 3(3,0) The modern tradition in English and American poetry from Yeats to the present; relevant critical essays. *Preq:* Sophomore literature.

ENGL 432, 632 Modern Fiction 3(3,0) American and British novels and short stories of the 20th century. *Preq:* Sophomore literature.

ENGL 433, 633 The Anglo-Irish Literary Tradition 3(3,0) Exploration of the unique literary heritage and achievement of English-language Irish writers in the 19th and 20th centuries. Major figures of the Irish tradition: W. B. Yeats, James Joyce, and Samuel Beckett, and other writers; consideration of the specifically Irish aspects of their works. *Preq:* Sophomore literature.

ENGL 434, 634 Environmental Literature 3(3,0) Survey of literature that examines the relationship between human beings and the natural world, including analysis of environmental themes in myths and legends and in selected poetry and prose of nineteenth- and twentieth-century England and America. *Preq:* Sophomore literature or consent of instructor.

ENGL 435, 635 Literary Criticism 3(3,0) Major critical approaches to literature. *Preq:* Sophomore literature.

ENGL 436, 636 Feminist Literary Criticism 3(3,0) Introduction to the germinal works of feminist literary theory and criticism. Outlines the development of modern literary criticism by studying feminist versions of the major critical methodologies. *Preq:* Sophomore literature or consent of instructor.

ENGL 437, 637 Directed Studies 1-3(1-3,0) Class and tutorial work for students with special interests or projects in American, British, or European literature outside the scope of existing courses. Applications must be approved during the registration period of the semester preceding the one in which directed studies will occur. May be repeated by arrangement with the department. *Preq:* Junior standing and approved registration.

ENGL H438 Departmental Honors Research 3(3,0) Research for the preparation of an honors project. *Preq:* Second-semester Junior standing, approval of the English Honors Committee.

ENGL H439 Departmental Honors Project 3(3,0) Preparation of an honors project. *Preq:* ENGL H438 and first semester Senior standing.

ENGL 440, 640 Literary Theory 3(3,0) Examination of how approaches such as Marxism, Psychoanalysis, Feminism, Deconstruction, New Historicism, Post-Colonialism, Cultural Studies, and Queer Theory answer the question, "What is literature?" *Preq:* Sophomore literature.

ENGL 441 Literary Editing 3(3,0) Examination of how the theories and practices of editing construct texts, stressing the problems and objectives of editing and providing practical experience with literary editing. *Preq:* Sophomore literature.

ENGL 445, 645 Fiction Workshop 3(3,0) Workshop in the creative writing of prose fiction. May be repeated once for credit. *Preq:* ENGL 345 or consent of instructor.

ENGL 446, 646 Poetry Workshop 3(3,0) Workshop in the creative writing of poetry. May be repeated once for credit. *Preq:* ENGL 346 or consent of instructor.

ENGL (THEA) 447, 647 Playwriting Workshop 3(0,3) See THEA 447.

ENGL 448, 648 Screenwriting Workshop 3(3,0) Workshop in the creative writing of screenplays. May be repeated once for credit. *Preq:* ENGL 348 or consent of instructor.

ENGL 450, 650 Film Genres 3(2,3) Advanced study of films that have similar subjects, themes, and techniques, including such genres as the Western, horror, gangster, science fiction, musical, and/or screwball comedy. Also considers nontraditional genres, screen irony, genre theory, and historical evolution of genres. Topics vary. *Preq:* ENGL 357 or consent of instructor.

ENGL 451, 651 Film Theory and Criticism 3(2,3) Advanced study into the theory of film/video making with an emphasis on understanding a variety of critical methods to approach a film. Examines the history of film theory and defines the many schools of film criticism, including realism, formalism, feminism, semiotics, Marxism, and expressionism. *Preq:* ENGL 357 or consent of instructor.

ENGL 452, 652 Great Directors 3(2,3) Intensive study of one to three film directors with an emphasis on understanding the entire canon of each director. Students study similarities in techniques, shifts in thematic emphasis, and critical methodologies for approaching the works of each director. Topics vary. *Preq:* ENGL 357 or consent of instructor.

ENGL 453, 653 Sexuality and the Cinema 3(2,3) Examination of male/female sexual roles and their evolution in American genre films, avant-garde cinema, and international films. Includes the study of movies in relation to cultural values and social stereotypes, introduction to feminist film theory, and consideration of film pornography. *Preq:* ENGL 357 or consent of instructor.

ENGL (LANG) 454 Selected Topics in International Film 3(2,3) See LANG 454.

ENGL 455, 655 American Humor 3(3,0) Native American humor of the 19th and 20th centuries. *Preq:* Sophomore literature.

ENGL (HUM) 456 Literature and Arts of the Holocaust 3(3,0) Addresses the Holocaust through literature, art, architecture, music, and film. Beginning with historical, political, and economic forces that contributed to the Holocaust, course then focuses on highly diverse creative responses to this event—responses that often reflect the difficulties and politics of these commemorative gestures. *Preq:* Sophomore literature or consent of the instructor.

ENGL 459, 659 Advanced Special Topics in Language, Literature, or Culture 3(3,0) Advanced studies in topics not central to other English courses, such as certain authors, works, genres, themes, or areas of knowledge and culture. Specific topics are announced when offered. May be repeated once for credit with department chair's consent. *Preq:* Sophomore literature.

ENGL 460 Issues in Writing Technologies 3(3,0) Examination of writing technologies from different historical periods. Investigates how writing is understood, circulated, legislated, and protected in terms of its production technology. *Preq:* Sophomore literature; ENGL 211 or permission of instructor.

ENGL 470 Views of Literacy 3(3,0) Examines what it means to be or become literate from perspectives of literature, composition, classics, education, anthropology, linguistics, psychology, history. *Preq:* Sophomore literature, one 300-level writing course.

ENGL 475, 675 Writing for Electronic Media 3(3,0) Hands-on workshop in new forms of writing and hypertextual design for interactive electronic media. May be repeated once for credit. *Preq:* Sophomore literature or consent of instructor.

ENGL 478, 678 Digital Literacy 3(3,0) Examines how electronic texts differ from and resemble print texts. Includes reading, studying, and analyzing print and digital texts to determine how digital techniques change patterns of reading and how readers make sense of electronic texts. *Preq:* ENGL 304 or 314 or permission of instructor.

ENGL 482, 682 African American Fiction and Nonfiction 3(3,0) Critical examination of the various forms and genres of African American prose including the novel, short fiction, autobiography, nonfiction, and oratory with some attention to emerging theories about African American culture and its impact on American cultural life in general. *Preq:* Sophomore literature.

ENGL 483, 683 African American Poetry, Drama, and Film 3(3,0) Studies in the various forms, themes, and genres of African American poetry, drama, and film with some attention to emerging theories about African American culture and its impact on American cultural life in general. *Preq:* Sophomore literature.

ENGL 485, 685 Composition for Teachers 3(3,0) Practical training in teaching composition: finding workable topics, organizing and developing observations and ideas, evaluating themes, and creative writing. *Preq:* Sophomore literature.

ENGL 490, 690 Advanced Technical and Business Writing 3(3,0) Advanced work in writing proposals, manuals, reports, and publishable articles. Students produce work individually and in groups. *Preq:* ENGL 304 or 314 or consent of instructor.

ENGL (SPCH) 491, 691 Classical Rhetoric 3(3,0) Study of the major texts in classical rhetoric. Examines the nature and functions of rhetoric in Greek and Roman societies. Traces the development of rhetoric from Protagoras through Isocrates, Plato, Aristotle, Cicero, and Quintillian and considers questions essential to understanding persuasive theory and practices. *Preq:* Sophomore literature or consent of instructor.

ENGL (SPCH) 492, 692 Modern Rhetoric 3(3,0) Examines the "new rhetorics" of the 20th century, which are grounded in classical rhetoric but which include findings from biology, psychology, linguistics, and anthropology, among other disciplines. Considers the theories and applications of communication. *Preq:* Sophomore literature or consent of instructor.

ENGL 494, 694 Writing About Science 3(3,0) Advanced work in scientific writing and editing for peer and lay audiences. *Preq:* ENGL 304, 314, or consent of instructor.

ENGL 495, 695 Technical Editing 3(3,0) Practical experience in editing and preparing technical manuscripts for publication. General introduction to the functions of the technical editor. *Preq:* ENGL 304, 314, or consent of instructor.

ENGL 499 Practicum in Writing 3(3,0) Students apply their knowledge of concepts and principles to a substantive project involving their internship experiences and/or writing and publishing interests. To be taken Pass/Fail only. *Preq:* Sophomore literature, Junior standing in Writing and Publication Studies or English.

ENTOMOLOGY

Professors: P. H. Adler, D. R. Alverson, T. M. Brown, G. R. Carner, J. D. Culin, *Chair;* J. C. Morse, P. A. Zungoli; *Associate Professor:* W. M. Hood

ENT 200 Six-Legged Science 3(3,0) Introduction to insects, their various relationships with humans, other animals, and plants. The general nature of this course makes it beneficial to all students regardless of specialty. Closed to students who have had ENT 301 or equivalent.

ENT 201 Current Topics in Entomology 1(1,0) Discussion course covering topics dealing with insects and related arthropods. Subjects are chosen to reflect issues of current interest as well as those having significance in human history. May be repeated for a maximum of three credits.

ENT 300 Environmental Entomology 3(3,0)S Exploration of diversity and roles of insects in natural and affected environments, impact of insects and pesticides on environmental quality, and discussion of environmental ethics in entomological science. *Preq:* Any biological or physical science.

ENT 301 General Entomology 4(3,3)F Introduction to the study of insects, with emphasis on their structure, function, ecology, and behavior. Identification of commonly encountered species is highlighted. Relationships between insect and human populations are discussed. Control technologies are introduced, with emphasis on environmentally responsible tactics.

ENT 305 Presentation of Scientific Information 3(2,2) [O.2]F Instruction and practice in delivering oral presentations of scientific information and preparing visual aids. Emphasis is on oral scientific presentations for various target groups including scientists, service technicians, growers, amateur enthusiasts, the general public, and other audiences in which scientific information is transferred.

ENT 308 Apiculture 3(2,3)S Even-numbered years. Detailed study of the honey bee and its economic importance in pollination and honey production. Attention is given to bee behavior, colony management, equipment, honey-plant identification, and honey production and processing. *Preq:* BIOL 104 and consent of instructor.

ENT 401, H401, 601 Insect Pests of Ornamental Plants and Shade Trees 3(2,3)F Odd-numbered years. Recognition, biology, damage, and control of insect pests of woody and other ornamental plants and shade trees. *Preq:* ENT 301.

ENT 404, H404, 604 Urban Entomology 3(2,3)F Even-numbered years. Study of pests common to the urban environment with emphasis on biology, damage, control, and identification of household, structural, stored products, and food pests. Students learn both theoretical and practical aspects of urban pest management and the pest-control industry. *Preq:* ENT 301.

ENT 405, H405, 605 Insect Morphology 4(3,3)F Even-numbered years. Study of insect structure in relation to function and of the variation of form in insects. *Preq:* ENT 301.

ENT (PL PA) 406, H406, 606 Diseases of Insects and Turfgrasses 3(2,2)F See PL PA 406.

ENT 407, 607 Applied Agricultural Entomology 4(3,3)F Even numbered years. Topics include recognition, biology, damage, and control of economically important insects and mites found on major Southeastern field, fruit, nut, and vegetable crops. Principles and practices of crop protection, including pesticide application, economic basis for decision making, and development of scouting programs are introduced. *Preq:* ENT 301 or equivalent.

ENT 410, 610 Insect Taxonomy 3(1,6)S Odd-numbered years. Identification of the principal families of the major orders of adult insects. Laboratory work consists of intensive practice of such identification; lecture material deals with theoretical discussion of taxonomic features observed in the laboratory. *Preq:* ENT 405 or consent of instructor.

ENT 420, 620 Toxicology of Insecticides 3(2,3)S Odd-numbered years. Concepts of insecticide toxicology; principles of insecticide action; toxicological and pharmacological effects in insects and higher animals, safety, current regulations governing the use of insecticides. *Preq:* ENT 301.

ENT (ENTOX) 430, 630 Toxicology 3(3,0)F Odd-numbered years. Basic principles of toxicology including quantitation of toxicity, toxicokinetics, biochemical action of poisons, and environmental toxicology are studied. Acute and chronic effects of various classes of poisons (e.g., pesticides, drugs, metals, and industrial pollutants) are discussed in relation to typical routes of exposure and regulatory testing methods. *Preq:* Organic Chemistry, one year of general biology, or consent of instructor.

ENT 440, 640 Insect Behavior 3(2,3)F Odd-numbered years. Fundamentals of insect behavior in an evolutionary and ecological perspective. Laboratory emphasizes generation and testing of hypotheses and observation, description, and quantification of insect behavior. *Preq:* ENT 301 or consent of instructor.

ENT 455, H455, 655 Medical and Veterinary Entomology 3(2,3)F Odd-numbered years. Insects and their arthropod relatives which are of economic importance in their effect on man and animals. *Preq:* ENT 301 or consent of instructor.

ENT 461 Directed Research in Entomology 1-3(0,3-9) Development of a senior thesis based on a research problem in a selected entomological area. Emphasis is on integrating the knowledge gained in the student's program with the results of the research project. May be repeated for a maximum of three credits. *Preq:* Senior standing, consent of instructor.

ENT 462, 662 Seminar Presentation 1(1,0) [O.1] Advanced instruction and practice in delivering oral seminar presentations of scientific information. Emphasis is on preparing visual aids, organization, content, and practice in speaking to a specialized scientific audience.

ENT (W F B) 469, H469, 669 Aquatic Insects 3(1,6)S Odd-numbered years. Identification, life history, habitats, and interrelationships of aquatic insects; techniques of qualitative field collecting; important literature and research workers. *Preq:* ENT 301 or consent of instructor.

ENT 490 Practicum 1-4 Supervised entomological learning opportunity providing highly individualized experiences to complement other programs and courses. Must be prearranged at least two months in advance. Must file written reports midway during enrollment period and at its conclusion. Must appear for oral evaluation at the end of the period. *Preq:* Junior standing and consent of instructor.

ENT (GEN) 495, 695 Insect Biotechnology 3(3,0)S Odd-numbered years. Considers many unique genetic features exhibited by insects and describes the applications of biotechnology to enhance useful products from insects and to affect the control of destructive insects. *Preq:* ENT 301, GEN 302.

ENVIRONMENTAL AND NATURAL RESOURCES

E N R 101 Introduction to Environmental and Natural Resources I 1(1,0) Informative overview of environmental and natural resources and their impact on society; education and career opportunities are emphasized.

E N R 102 Introduction to Environmental and Natural Resources II 1(1,0) Continuation of E N R 101 with continuing emphasis on education and career opportunities; current issues and basic science related to the natural resources professions are introduced.

E N R 302 Natural Resources Measurements 3(2,3) Introduction to measurements of natural resources including land, vegetation, animal habitat, water quality and quantity, climate and recreation. Remote sensing techniques are also introduced. May not be taken for credit by Forest Resource Management majors. *Coreq:* EX ST 301.

E N R (BIOSC) 413 Restoration Ecology 3(3,0) Applies ecological principles to the restoration of disturbed terrestrial, wetland, and aquatic ecosystems. Includes the restoration of soils and waterways, of flora and fauna, and of natural ecological processes such as plant succession and nutrient cycling. *Preq:* Introductory course in ecology or conservation biology, permission of instructor.

E N R (FOR) 416 Forest Policy and Administration 2(2,0) See FOR 416.

E N R (C R P, FOR) 434 Geographic Information Systems for Landscape Planning 3(1,6) See C R P 434.

E N R 450, 650 Conservation Issues 3(3,0) Interactive study and discussion of issues related to the conservation of natural resources, emphasizing current issues in the conservation of biodiversity, identification of conflicting issues between consumptive and nonconsumptive resource management, and development of viable solutions for conservation of natural resources. *Preq:* W F B (BIOSC) 313 or consent of instructor.

ENVIRONMENTAL ENGINEERING AND SCIENCE

Professors: A. W. Elzerman, *Chair;* R. W. Falta, R. A. Fjeld, C. P. L. Grady, T. M. Keinath, F. J. Molz, J. D. Navratil, T. J. Overcamp; *Associate Professors:* J. T. Coates, Jr., *Research Associate;* D. L. Freedman, C. M. Lee; *Assistant Professors:* C. S. Christoforou, T. A. DeVol, T. Karanfil, L. Murdoch; *Lecturers:* J. M. Rudolph, M. L. Thompson

EE&S 401, 601 Environmental Engineering 3(3,0) Introduction to the field of environmental engineering. Topics include environmental phenomena, impact of pollutants in the aquatic environment, solid-waste management, air pollution control, radiological health, and simple water and wastewater treatment systems. *Preq:* Junior standing in engineering or consent of instructor. *Coreq:* C E 341, CH E 311, E M 320, or consent of instructor.

EE&S 402, 602 Water and Waste Treatment Systems 3(3,0) Study of fundamental principles, rational design considerations, and operational procedures of the unit operations and processes employed in water and waste treatment. Both physiochemical and biological treatment techniques are discussed. Introduction to the integration of unit operations and processes into water and waste treatment systems. *Preq:* C E 341, CH E 311, E M 320 or consent of instructor.

EE&S 410, 610 Environmental Radiation Protection I 3(3,0) Fundamental principles of radiological health and radiation safety. Topics include radiation fundamentals, basic concepts of environmental radiation protection, internal and external dosimetry, environmental dose calculations and radiation protection standards. *Preq:* Consent of instructor.

EE&S 411, 611 Ionizing Radiation Detection and Measurement 3(2,3) Laboratory exercises in ionizing radiation detection and measurements. Topics include nuclear electronics; counting statistics; radiation interactions; basic gas, scintillation, and semiconductor detectors; gamma-ray spectroscopy; health physics survey instrumentation; and thermoluminescent dosimetry. *Preq:* EE&S 410 or consent of instructor.

EE&S 430, 630 Air Pollution Engineering 3(3,0) Introductory course in air pollution and its control. Topics include air pollutants and effects, sources, dispersion models, engineering controls, and air-quality legislation. *Preq:* Senior standing in engineering or physical sciences.

EE&S (B E, FOR) 451, H451, 651 Newman Seminar and Lecture Series in Natural Resources Engineering 1(0,2) See B E 451.

EE&S 480, 680 Environmental Risk Assessment 3(3,0) Quantitative estimation of human health risk posed by the release of a contaminant to the environment. Topics include methods for analyzing emission rate, environmental transport, exposure, and health effects; methods of uncertainty analysis; and the role of risk assessment in environmental regulation and environmental decision making. *Preq:* EE&S 401 or consent of instructor.

EE&S (B E, I E) 484, 684 Municipal Solid Waste Management 3(3,0) Introduction to the problems, regulations, collection, handling, recycling, and disposal of municipal solid wastes in the urban and rural sectors. Emphasis is on an integrated waste-management system with resource recovery, composting, incineration, landfill disposals and their costs. *Preq:* Senior standing in engineering or science or consent of instructor.

EE&S 485, 685 Hazardous Waste Management 3(3,0) Introduction to the problems, regulations, treatment, and ultimate disposal of hazardous and toxic materials. Spill cleanup, groundwater transport, land disposal, incineration, and treatment technologies are discussed. *Preq:* EN SP 200 or EE&S 401 or permission of instructor; two semesters of general chemistry.

EE&S 486, 686 Pollution Prevention and Industrial Ecology 3(3,0) Topics include pollution prevention technology, the role of pollution prevention within a corporation, source reduction and recycling assessments, treatment to reduce disposal, life-cycle assessment, design for environment, and industrial ecology. Emphasis is on case studies. *Preq:* Senior standing in College of Engineering and Science.

EE&S 491 Selected Topics in Environmental Engineering 1-3 Study of the dynamic role of environmental engineering in maintaining environmental quality. A comprehensive study of any phase of environmental engineering. May be repeated for credit, but only if different topics are covered. *Preq:* Consent of department chair.

ENVIRONMENTAL SCIENCE AND POLICY

Professors: A. W. Elzerman, *Coordinator;* R. E. Franklin, W. H. Leonard, E. M. Murrow, J. E. Schindler, T. B. Yandle, Jr.; *Associate Professors:* L. D. Fredendall, J. B. London, W. F. Steirer, J. R. Wagner

EN SP 200 Introduction to Environmental Science 3(3,0) Basic principles of environmental science including ecology, energy, resources, waste management; and air, water, and soil pollution. Consideration of issues, specific cases, investigative approaches and remedial actions. *Preq:* Sophomore standing and two semesters of either freshman chemistry or biology.

EN SP (AGRIC) 315, H315 Environment and Agriculture 3(3,0) See AGRIC 315.

EN SP 400 Studies in Environmental Science 3(3,0) Study of historical perspectives, attitudes, and government policy within the framework of environmental case studies to illustrate the interaction between human and natural factors as they mutually affect the environment and man's ability to deal with that environment. *Preq:* EN SP 200 or consent of instructor.

EN SP 431, 631 Public Health Administration 3(3,0) Prepares students for careers in the environmental sciences, with positions in public health and pollution control. Topics include public health organizations and regulations, public relations, psychology of public health administration, and the use of the communications media in educating the public on health problems.

EN SP 432 Inspection Methods in Water and Solid Waste 3(2,3) Methods of disposal of liquid and solid wastes are emphasized in regard to environmental quality control. Treatment plant methods are discussed. Inspection techniques for adequate treatment is a basic approach.

EN SP 471, 671 Man and His Environment 2(2,0) The interaction of man with his environment is surveyed. Factors such as urbanization, population growth, pathogens, disease vectors, ionizing radiation, sewage disposal, and noise control are considered. Effects of environmental contacts with air, water, food, and solid and liquid wastes are emphasized. *Preq:* Consent of instructor.

EN SP 472, 672 Environmental Planning and Control 2(2,0) Application of planning and control to effective environmental quality improvement. Water supply and treatment, wastewater treatment and disposal, solid waste disposal, air pollution abatement, and land use and zoning are considered from the standpoint of control. Not intended for graduate students in engineering. *Preq:* Consent of instructor.

ENVIRONMENTAL TOXICOLOGY

Professors: L. J. Bain, W. W. Bowerman, E. R. Carraway

ENTOX 400, H400, 600 Wildlife Toxicology 3(3,0) Assessment of impacts of toxic substances on reproduction, health, and well-being of wildlife species; acute and chronic effects of agricultural chemicals, pesticides, hazardous waste, industrial waste, and oil releases are discussed. *Preq:* BIOCH 210 or organic chemistry, one year of general biology, W F B 350 or consent of instructor.

ENTOX 421, H421, 621 Chemical Sources and Fate in Environmental Systems 3(3,0) Chemical cycles in the environment are discussed on global and microcosm scales. The dependence of fate processes on physical and chemical properties and environmental conditions is examined. Breakdown, movement, and transport of selected toxicants are addressed to illustrate the mechanisms that govern chemical fate. *Preq:* Organic and analytical chemistry or consent of instructor.

ENTOX (ENT) 430, 630 Toxicology 3(3,0)F See ENT 430.

EXECUTIVE LEADERSHIP AND ENTREPRENEURSHIP

E L E 301 Executive Leadership and Entrepreneurship I 3(2,3) Comprehensive, cross-disciplinary fundamentals of entrepreneurship and executive leadership. Team taught by faculty from various disciplines. *Preq:* Sophomore standing, nomination and selection by faculty.

E L E (MKT) 314 New Venture Creation I 3(3,0) See MKT 314.

E L E (MGT) 315 New Venture Creation II 3(3,0) See MGT 315.

E L E (ECON) 321 Economics of Innovation 3(3,0) See ECON 321.

E L E (PO SC, PSYCH, SOC) 356 Social Science of Entrepreneurship 3(3,0) See SOC 356.

E L E 401 Executive Leadership and Entrepreneurship II 3(2,3) Comprehensive, cross-disciplinary fundamentals of entrepreneurship and executive leadership. Case studies of business success and failures. Continuation of E L E 301. *Preq:* E L E 301.

E L E 499 Executive Leadership and Entrepreneurship III 3-6(1-3,6-12) Directed practical study of entrepreneurship and leadership. Continuation of E L E 301 and 401. Students work closely with external infant firms to develop new products and bring existing products to market successfully. *Preq:* E L E 401.

EXPERIMENTAL STATISTICS

Professors: W. C. Bridges, Jr., L. W. Grimes, H. S. Hill, Jr., *Chair;* J. E. Toler; *Associate Professor:* J. R. Rieck; *Lecturer:* R. Martinez-Dawson

EX ST 301, H301 Introductory Statistics 3(2,2) Basic concepts and methods of statistical inference; organization and presentation of data, elementary probability, measures of central tendency and variation, tests of significance, sampling, simple linear regression and correlation. The role of statistics in interpreting research and the general application of the methods are stressed. Credit toward a degree will be given for only one of EX ST 301, MTHSC 301, 302.

EX ST 411, 611 Statistical Methods for Process Development and Control 3(3,0) Experimental design techniques for use in process development, application of screening experiments and response surface experiments, techniques for process control with implications for product quality control. Includes discussions of the use of statistical computer analyses and interpretations including computer generated graphics. *Preq:* MTHSC 206 or consent of instructor.

EX ST 462, 662 Statistics Applied to Economics 3(3,0) Continuation of EX ST 301 with emphasis on statistical methods used in the collection, analysis, presentation, and interpretation of economic data. Special attention is given to time series analysis, the construction of index numbers, and the designing of samples for surveys in the social science fields. *Preq:* EX ST 301.

FINANCE

Professors: J. C. Alexander, Jr., M. F. Spivey, N. G. Waller; *Associate Professors:* J. M. Harris, Jr., Y. C. Kim, R. H. Klein, R. B. McElreath, Jr., *Chair;* *Assistant Professors:* J. G. Wolf, A. G. Morgan; *Lecturer:* K. McMillan; *Visiting Lecturer:* C. Hyldahl

FIN 301 Personal Finance 3(3,0) Analysis of the preparations of personal financial plans. Topics include savings and budgeting, personal taxes, housing and automobile decisions, loans, insurance needs, investments, and retirement needs. Cannot be counted towards a degree in Financial Management.

FIN 304 Risk and Insurance 3(3,0) Studies the nature of risk and the role of insurance in risk management from individual and business viewpoints. Topics include probability, theory of the firm under uncertainty, insurance carriers and contracts, underwriting, and regulation. *Preq:* FIN 306 or 311 or consent of instructor.

FIN 305 Investment Analysis 3(3,0) Study of techniques useful in analyzing alternative investment opportunities with emphasis on corporate securities. Investment planning and portfolio management are considered. *Preq:* C or better in FIN 306 or 311 or consent of instructor.

FIN 306 Corporation Finance 3(3,0) Introduction to financial management of nonfinancial firms. Includes such topics as analysis of financial statements, financial forecasting, capital budgeting, working capital management, and long-term financing decisions. Credit may not be received for both FIN 306 and 311. *Preq:* ACCT 201, MTHSC 203 or 301 or EX ST 301, or consent of instructor.

FIN 307 Principles of Real Estate 3(3,0) Acquaints students with the theories, practices, and principles which govern real estate markets. Major emphasis is on specifics of real estate brokerage, property rights, and ownership; making real estate investment decisions; and financing real estate investments. *Preq:* C or better in FIN 306 or 311 or consent of instructor.

FIN 308 Financial Institutions and Markets 3(3,0) Study of the various types of financial institutions and of topics critical to the financial institutions practitioner. Topics include financial regulations, financial security types and their yields, interest rate risk management, foreign currency risks management, and stock index futures. *Preq:* C or better in FIN 306 or 311 or consent of instructor.

FIN 311, H311 Financial Management I 3(3,0) First in a two-course sequence to provide in-depth exposure to the theory and practice of corporate financial management and to demonstrate how financial management techniques are applied in decision making. Credit cannot be received for both FIN 306 and 311. *Preq:* C or better in ACCT 201, MTHSC 301 or EX ST 301 or consent of instructor.

FIN 312, H312 Financial Management II 3(3,0) Continuation of the two-course sequence that begins with FIN 311. *Preq:* C or better in FIN 311; or C or better in FIN 306 with approval of Finance Department advisor.

FIN 399 Finance Internship 1-3(1-3,0) Preplanned, preapproved, faculty-supervised internships to give students on-the-job learning in support of classroom education. Internships must be no less than six full-time, consecutive weeks with the same internship provider. Restricted to students with a major or minor in Financial Management. To be taken Pass/Fail only. *Preq:* Consent of instructor.

FIN 402, H402 Managing Business Assets 3(3,0) Study of the decision process and analytical techniques used in evaluating corporate investment decisions, including both long-term capital investments and working capital management. Computer-based financial decision making is used. *Preq:* FIN 312 or consent of instructor.

FIN 404, H404 Financing of Businesses 3(3,0) Financial policy, theory, and cases dealing with the use of debt financing, dividend policy, convertible securities, mergers and acquisitions, leasing, and special topics. *Preq:* FIN 312 or consent of instructor.

FIN 405, 605 Portfolio Management and Theory 3(3,0) Introduction to portfolio management. Includes the underlying theory, managing the equity and the fixed-income portfolios, portfolio evaluation, options-pricing theory, future markets and instruments. *Preq:* FIN 305 and either 306 or 311; or consent of instructor.

FIN 406, 606 Analysis and Use of Derivatives 3(3,0) Consideration of the option pricing theory and strategy techniques most commonly used in the market for options. An overview of the futures markets is also considered. Special emphasis is given to interest-rate futures, stock-index futures, and foreign-exchange futures. *Preq:* FIN 305 or consent of instructor.

FIN 408 Management of Financial Institutions 3(3,0) Detailed study of the operational, marketing, and regulatory aspects of the management of depository financial institutions. Emphasis is on decision making through the extensive use of cases. *Preq:* FIN 308.

FIN 409 Professional Financial Planning 3(3,0) Concepts and practical implementation of professional financial planning, with focus on essentials of budgeting and saving, risk management, tax planning, investment planning, and retirement and estate planning. Emphasis is on integrating these elements into a comprehensive personal financial plan. *Preq:* ACCT 404, 408, FIN 304, 305.

FIN 410, H410, 610 Research in Finance 1-3 Directed research course for students interested in a career in finance. Research topic is selected by student and approved by instructor. A formal research paper is required. *Preq:* FIN 306 or 312, consent of instructor.

FIN 411 International Financial Management 3(3,0) Extension of the principles of finance to the international context. Focuses on the implications of the existence of multiple currencies and the operations across borders of sovereign nation-states for the multinational corporation. *Preq:* FIN 312 or C or better in FIN 306 or consent of instructor.

FIN 415, 615 Real Estate Investment 3(3,0) Focuses on the structure and analysis of real estate investment emphasizing financial theory and analysis technique. Case study and project-oriented homework assignments facilitate the understanding of real estate investments. *Preq:* FIN 307 and 306 or 311.

FIN 417, 617 Real Estate Finance 3(3,0) Advanced course applying financial analysis and theory to real estate. Mortgage credit analysis and current financing techniques for residential and commercial properties are emphasized. Topics include financial institutions, syndications, and construction financing. *Preq:* C or better in FIN 307, 311 or consent of instructor.

FOOD SCIENCE

Professors: J. C. Acton, R. D. Galyean, M. E. Kunkel, J. U. McGregor, *Chair;* J. G. Surak; *Associate Professors:* F. H. Barron, P. L. Dawson; *Assistant Professors:* K. K. Getty, V. J. Haley-Zitlin; *Instructor:* R. M. Haliena; *Adjunct Professor:* C. R. Barmore; *Adjunct Assistant Professor:* E. J. Rhodehamel; *Adjunct Instructors:* R. R. Perdue, K. G. Schwartz

FD SC 101 Epochs in Man's Struggle for Food 1(1,0) Study of significant developments in food preservation methods and the impact each has had on man's struggle for food.

FD SC 102 Perspectives in Food and Nutrition Sciences 2(2,0) Discussion course covering topics related to food science and human nutrition. Subjects include topics of current interest and involve familiarization with scientific literature in nutrition and food sciences.

FD SC 201 Man and His Food 2(2,0) Study of food and food products with emphasis on nutrients, nutrient needs, and the relationship between nutrient intake and health. Food additives, nutritional awareness (including nutrition labeling), food protection, and the influence of processing on nutritional quality of food are also discussed.

FD SC 214 Food Resources and Preservation 4(4,0) Studies food material resources and their preservation for quality and consumption as scientifically and technically practiced in the food industry. Food preservation by refrigerated and frozen storage, thermal processing and pasteurization, dehydration and concentration, fermentation, irradiation, microwave heating, and food additives.

FD SC 306 Food Service Operations 3(3,0) Principles of management of resources in food service systems. Emphasis is on menu planning, types of delivery systems, principles of quantity food production, techniques for cost control and concepts of food science and food safety. *Preq:* FD SC 214 or equivalent or consent of instructor.

FD SC 401, H401, 601 Food Chemistry I 4(3,3)F Even-numbered years. The basic composition, structure, and properties of food and the chemistry of changes occurring during processing utilization. *Preq:* BIOCH 210 or consent of instructor.

FD SC 402, H402, 602 Food Chemistry II 4(3,3)S Odd-numbered years. Application of theory and procedures for quantitative and qualitative analysis of food ingredients and food products. Methods for protein, moisture, lipid, carbohydrate, ash, fiber, rancidity, color, and vitamin analyses and tests for functional properties of ingredients are examined. *Preq:* BIOCH 210 or consent of instructor.

FD SC 404, 604 Food Preservation and Processing 3(3,0) Principles of food preservation applied to flow processes, ingredient functions, and importance of composition and physical characteristics of foods related to their processing; product recalls and product development concepts. *Preq:* Physics and organic chemistry or biochemistry.

FD SC 406, 606 Food Preservation and Processing Laboratory I 1(0,3) Laboratory exercises on preservation methods, equipment utilized, and processes followed in food manufacture. *Coreq:* FD SC 404.

FD SC 407, 607 Quantity Food Production 2(1,3) Principles of the production of food in quantity for use in food service systems. Emphasis is on functions of components of foods and of ingredients in food on the quality of the final product on safe production of food and on proper use of equipment. *Coreq:* FD SC 306, 404.

FD SC 408, 608 Food Process Engineering 4(3,3) Study of basic engineering principles and their application in food processing operations. The relation between engineering principles and fundamentals of food processing is emphasized. *Preq:* FD SC 214, CH 102, MTHSC 106, PHYS 207 or 200 or 122 or consent of instructor.

FD SC (PKGSC) 409 Total Quality Management for the Food and Packaging Industries 3(3,0) Introduction to the principles of modern quality management with emphasis on quality standards and issues and the practices necessary for food processing and packaging companies to survive in a customer-driven marketplace.

FD SC 417 Seminar 1(1,0) Literature research and oral presentation of current food science topics.

FD SC 418 Seminar 1(1,0) Literature research and oral presentation of current food science topics.

FD SC 420, H420 Special Topics in Food Science 1-3(1-3,0) Special topics in food science not covered in other courses. May be repeated for a maximum of 12 credits, but only if different topics are covered. *Preq:* Permission of instructor.

FD SC 421, H421 Special Problems in Food Science 1-4(0,3-12) Independent research investigation in food science areas not conducted in other courses. May be repeated for a maximum of 12 credits. *Preq:* Permission of instructor.

FD SC 491 Practicum 1-4 Supervised experiential opportunities in the food industry. May be repeated for a maximum of 12 credits. *Preq:* Junior standing and consent of department chair.

FOREST AND RECREATION RESOURCES

F&RR (HIST) 392 History of the Environment of the United States 3(3,0) See HIST 392.

FOREST RESOURCES

Professors: D. C. Guynn, Jr., R. L. Hedden, D. N.-S. Hon, P. A. Layton, *Chair;* A. W. Lee, A. P. Marsinko, L. E. Nix, G. E. Sabin, T. J. Straka, F. H. Tainter, D. H. Van Lear, T. E. Wooten; *Associate Professors:* V. B. Shelburne, G. K. Yarrow; *Assistant Professors:* L. R. Gering, J. D. Lanham, A. E. Miller, T. G. Weigel

FOR 101 Introduction to Forestry 1(1,0)F Informative sketch of forestry, forests, and forestry tasks of the nation; education and career opportunities for foresters.

FOR 102 Introduction to Forestry 1(1,0)S Continuation of FOR 101.

FOR 205 Dendrology 3(2,3)F Classification, nomenclature, and identification of the principal forest trees of the United States, their geographical distribution, ecological requirements, and economic importance. Field identification of native trees and commonly planted exotics in the Piedmont and surrounding areas. *Preq:* BIOL 103 or consent of instructor.

FOR 206 Forestry Ecology 3(2,3)S Study of the nature of forests and forest trees, how they grow, reproduce, and their relationships to the physical and biological environment. *Preq:* CSENV 202, BIOL 103, FOR 205 or consent of instructor.

FOR (PRTM) 209 Professional Application of Microcomputers 3(1,4) [C.3] See PRTM 209.

FOR 221 Wood Properties I 3(2,3)F Formation of wood in forest trees, gross and minute characteristics of wood, defects in wood, variability in wood. *Preq:* BIOL 103 or consent of instructor.

FOR 222 Wood Properties II 3(2,3)S Wood in relation to moisture, heat, sound, light, and electricity; mechanical properties of wood; standard testing procedures for wood. *Preq:* FOR 221 or consent of instructor.

FOR 251 Forest Communities 2(0,6) Study of forest plant species and their successful status and habitat requirements with respect to landform, soil type, and other appropriate aspects of site classification. *Preq:* FOR 205 or consent of instructor.

FOR 253 Forest Mensuration 4(0,12) Introduction to measurements of land, individual trees, forest stands, forest products, and the application of mensurational techniques to the statistical and physical design of forest sampling methods, including measurement techniques of non-timber components of forest resources. *Preq:* FOR 205 or consent of instructor.

FOR 254 Forest Products (Summer Camp) 1(0,3) Tour of the forest products industry of South Carolina with an emphasis on those products and processes of some distinction or special interest. *Preq:* FOR 205 or consent of instructor.

FOR 255 Secondary Wood Products (Summer Camp) 1 Tour of the secondary wood products industries with an emphasis on industries too far from Clemson for the usual half-day field trips during regular sessions. *Preq:* FOR 205 or consent of instructor.

FOR 257 Forest Products Measurements (Summer Camp) 2 Measurements and classifications of a variety of wood products, from trees to finished products. *Preq:* FOR 221, 222 or consent of instructor.

FOR 300 Christmas Tree Production 2(2,0)F Theory and practice of establishing, managing, and marketing trees with an emphasis on Christmas tree production in the South. *Preq:* Consent of instructor.

FOR 302, 602 Forest Biometrics 3(2,3)S The application of statistical methods to forestry problems including sampling theory and methods, growth measurements and prediction, and application of microcomputing to analysis of forestry data. *Preq:* FOR 253. *Coreq:* EX ST 301 or consent of instructor.

FOR 304, 604 Forest Resource Economics 3(3,0)F Economic problems and principles involved in the utilization of forest resources and distribution of forest products; analysis of integrated forest operations. *Preq:* ECON 200 or consent of instructor.

FOR 305 Elements of Forestry 3(2,2)F,S Compendium of forestry subjects providing a broad view of the forest environment as it relates to ecology, management, and utilization of forests, especially those of South Carolina. Field and laboratory exercises in the fundamentals of forest-land management. Not open to Forest Resource Management majors. *Preq:* BIOL 103 or consent of instructor.

FOR 306 Wood and Wood Fiber Identification 2(1,3)F Macroscopic and microscopic identification, properties, and uses of selected economically significant timbers. *Preq:* BIOL 103 or consent of instructor.

FOR 308, 608 Remote Sensing and GIS in Forestry 2(1,3)F Introduction to remote sensing, aerial photo interpretation, computer mapping, aerial photo timber estimating, and geographical information systems. *Preq:* Forestry summer camp or consent of instructor.

FOR 310, 610 Silviculture 4(3,3)S Theory and practice of establishing, maintaining, and harvesting forest stands in accordance with ecological and economic principles. *Preq:* FOR 206, Forestry Summer Camp, or consent of instructor.

FOR 311 Forest Products Marketing Practices 3(3,0) Study of marketing practices currently employed by the forest-products industry and the application of basic marketing principles and strategic concepts in the industry's present and future marketing environment. *Preq:* Junior standing or consent of instructor.

FOR 314 Harvesting and Forest Products 4(3,3) Harvesting of forest products, structure and properties of economically important timbers, and production and properties of primary forest products. *Preq:* Forestry summer camp or consent of instructor.

FOR 315 Woodland Ecology 3(3,0) Overview of the forest emphasizing the living and nonliving components of the woodland habitat. Understanding man's use of the forest and interpreting the signs of plants, wildlife, and landscapes.

FOR 321 Drying and Machining of Wood 3(2,3)F Wood seasoning principles and practices, seasoning defects, machinery, and preparation of wood for processing. *Preq:* FOR 221, 222, or consent of instructor.

FOR 323 Deterioration and Preservation of Wood 2(2,0)S Deterioration agents, deterioration of wood in use, control of deterioration in manufacturing, preservation processes, types of preservation, fire retardants.

FOR 325 Chemical Aspects of Wood Utilization 3(2,1)F Fundamental physical, organic, and polymer chemistry is applied to chemical processing of wood. Structures, reactions, and applications of cellulose, hemicelluloses, and lignin are discussed. *Preq:* CH 102 or consent of instructor.

FOR 341 Wood Procurement Practices in the Forest Industry 3(3,0) Study of wood raw material procurement practices currently employed by the forest products industry, including pulp, paper, and related areas. *Preq:* Consent of instructor.

FOR 400, 600 Public Relations in Natural Resources 3(3,0) Identifying relevant policies, their characteristics and acceptance to natural resource management and techniques of maintaining appropriate public relations. *Preq:* Senior standing.

FOR 406 Forested Watershed Management 2(2,0) Basic discussion of processes and measurement of water flow on forested watersheds. Forest land management is stressed to assure adequate water quantity and quality. Role of water in nutrient cycling and forest growth is also discussed. *Preq:* FOR 315 or 401 or consent of instructor.

FOR 407, 607 Forest Operations 3(2,1)F Theory and practice of conducting forestry operations. Major emphasis is on the methods, analysis of associated cost, and productive rates for timber harvesting and other mechanized field operations. *Preq:* Senior standing or consent of instructor.

FOR 409, 609 Multiple-Use Forestry 2(2,0)S Study of the demand placed on forests for a variety of products and uses and how these can and must be reconciled in planning the management of each forest. *Preq:* Senior standing or consent of instructor.

FOR 411, 611 Harvesting Forest Products 3(2,3)S Application of engineering and cost-analysis techniques to the evaluation of the forest transport system and various harvesting situations. *Preq:* FOR 407 or consent of instructor.

FOR 412, 612 Forest Protection 2(2,0)S Prevention and suppression of forest fires; their effect upon the environment and people; factors affecting fire behavior; and use of fire in resource management. *Preq:* Senior standing or consent of instructor.

FOR 413, 613 Integrated Forest Pest Managment 4(3,3)F Nature and control of pests of forest trees and products. Focuses on the relation of pests to silviculture, management, and natural forest ecosystems. *Preq:* Junior standing in Forest Resource Management.

FOR 414, 614 Forest Management Plans 2(2,0)S Analysis of factors entering into forest working plans of several forestry organizations; preparation of a preliminary management plan of a sample area. *Preq:* FOR 417.

FOR 415, 615 Forest Wildlife Management 3(2,3)F Principles, practices, and problems of wildlife management with emphasis on upland forest game species. Habitat manipulation through use of appropriate silvicultural practices in association with other techniques is evaluated. *Preq:* FOR 310 or consent of instructor.

FOR (E N R) 416, 616 Forest Policy and Administration 2(2,0)S Introduction to the development, principles, and legal provisions of forest policy in the United States and an examination of administrative and executive management in forestry.

FOR 417, 617 Forest Resource Management and Regulation 3(3,0) Fundamental principles and analytical techniques in planning, management, and optimization of forest operations. *Preq:* FOR 302, 304, 308, 310, and Forestry summer camp.

FOR 418, 618 Forest Resource Valuation 3(3,0) Analysis of capital investment tools and their application to decision making among forestry investment alternatives; valuation of land, timber, and other resources associated with forestry, including the impact of inflation and taxes. *Preq:* FOR 304 or consent of instructor.

FOR 419 Senior Problems 1-3(1-3,0) Problems chosen with faculty approval in selected areas of forestry. With department chair's approval, may be repeated once for credit. *Preq:* Senior standing.

FOR 420, 620 Forest Products 3(2,3)S Primary forest products including lumber, poles and piles, veneers and plywoods, secondary wood products; chemically derived products from wood including pulp and paper, distillation products, wood hydrolysis; miscellaneous and minor forest products. *Preq:* FOR 306, Forestry Summer Camp, or consent of instructor.

FOR 421, 621 Biology and Silviculture of Hardwood Forests 2(1,2)F Study of the silvics, growth, and development of major hardwood species of North America that relates these biological characteristics to the ecology, silviculture, and utilization of the hardwood forests of the Eastern United States. *Preq:* FOR 205, 206, 306, 310, or consent of instructor.

FOR 422, 622 Forest Products International Trade 3(3,0) Study of major supply regions, major trade flows, international demand, trade patterns, and industry structure and practices involved in international trade of forest products. *Preq:* Senior standing or consent of instructor.

FOR 423, 623 Current Issues in Natural Resources 2(2,0)F Lectures in various fields of forestry delivered by selected representatives from forest industries, consultants, agencies, associations, and other forestry operations. Course will not be taught when enrollment is less than 15. To be taken Pass/Fail only. *Preq:* Junior standing or consent of instructor.

FOR 425 Forest Resource Management Plans 2(1,3) Development of multiple resource forest management plans. Economic and environmental impacts of implementing management plans. *Preq:* FOR 417 or consent of instructor.

FOR 426, H426 Forest Resource Management Plans Seminar 1(1,0) In-depth exploration of topics and problems presented in FOR 425. To earn honors credit, student must be enrolled in corequisite FOR 425 and earn a *B* or better in both courses. *Preq:* Senior standing, approval of Department of Forest Resources. *Coreq:* FOR 425.

FOR (HORT) 427, 627 Urban Tree Care 3(3,0) Principles, practices, and problems of protecting and maintaining trees in urban and recreational areas. Examines environmental and biological factors affecting trees in high-use areas, their management and cultural requirements, and the practices necessary for their protection and care as valuable assets in the landscape. *Preq:* Junior standing or consent of instructor.

FOR 429, 629 Wood Design 3(2,3)F Technical mechanical properties of wood; load analysis and design criteria; design of structural elements in wood. *Preq:* FOR 328 or consent of instructor.

FOR 430 Composite Wood Materials 3(2,3)F Manufacturing methods, physical and mechanical properties, and uses of wood-polymer composites, wood laminates, plywood, particleboard, fiberboard, reconstituted board products, structural sandwich panels, paper-base plastic laminates, and extruded and molded products. *Preq:* FOR 222 or consent of instructor.

FOR 431, 631 Recreation Resource Planning in Forest Management 2(1,3)S Odd-numbered years. Analysis of forest recreation as a component of multiple-use forest management; techniques of planning; physical and biological effects on forest environments; and forest site, user, and facility management.

FOR 432, 632 Forest Site Capability 2(2,0)S Analysis of use pressures on the forest land base and their effects on the capability of the forest to satisfy resource demands. Productivity and sensitivity of sites are discussed. *Preq:* Senior standing in Forestry or consent of instructor.

FOR 433, 633 GPS Applications 3(2,3) Develops competency in global positioning system (GPS) technology including theory, methods, and application to natural resources mapping. Topics include basic concepts of GPS; projection systems; types of data; mission planning; and data capture, correction, and export to geographical information systems (GIS). *Preq:* Senior standing or consent of instructor.

FOR (C R P, E N R) 434 Geographic Information Systems for Landscape Planning 3(1,6) See C R P 434.

FOR 440 Adhesives and Finishes 3(3,0)S Theory of adhesion, chemical bonding, rheology, physical chemistry of adhesion, theory of finishes and coatings for wood, paper, and other materials. *Preq:* Junior standing or consent of instructor.

FOR 441, 641 Properties of Wood Products 3(3,0) Basic properties of wood, including the hygroscopic, thermal, electrical, mechanical, and chemical properties; standard testing procedures for wood. *Preq:* Junior standing of consent of instructor.

FOR 442, 642 Manufacture of Wood Products 3(3,0) Manufacture of lumber, plywood, poles, piles; drying, preservation, grading, and uses of wood products. Manufacture of particleboard, flakeboard, oriented-strand board; fiberboard, and paper products. Includes physical, mechanical, and chemical properties, and their applications. *Preq:* Consent of instructor.

FOR 443, 643 Manufacture of Wood Products II 3(3,0) Manufacture of particleboard, flakeboard, oriented-strand board, fiberboard, and paper products. Includes their physical, mechanical, and chemical properties, and their applications. *Preq:* FOR 221 or consent of instructor.

FOR 444, 644 Forest Products Marketing and International Trade 3(3,0) Study of marketing and international trade practices currently employed by the forest products industry and the application of basic marketing principles and global trade concepts in the industry's current and future environment. *Preq:* FOR 442 or 443 or consent of instructor.

FOR 445, 645 Forest Products and the Environment 3(3,0) Introduction to the use of wood as a basic material and its impact on the environment. Discusses environmental issues affecting wood processing, pulp and paper, and preservation industries. Includes the reuse and recycle of wood and paper wastes and the development of composites from these wastes. *Preq:* FOR 442 or consent of instructor.

FOR 446, 646 Wood Products Applications and Specifications 3(3,0) Application of lumber, plywood, particleboard, waferboard, oriented-strand board, and treated-wood products in building construction. Includes the proper application of load tables, allowable span, and spacing. *Preq:* FOR 442 or 443 or consent of instructor.

FOR 447, 647 Special Problems in Forest Products 1-3(0,3-9) Laboratory, library, or field study of problems in selected areas of forest products. Emphasis is on the planning and execution of research, and the reporting of results. The research work must be conducted under the guidance of a Forest Products faculty. May be repeated for a maximum of three credits, but only if different topics are covered. *Preq:* Senior standing and consent of instructor supervising the study.

FOR 450 Woody Plant Stress Physiology 3(3,0) Structure, function, and physiology of tree shoot and crown growth, wood formation, diameter growth, root growth, and reproduction especially as related to stress factors. *Preq:* BIOSC 401 or FOR 460 or permission of instructor.

FOR (B E, EE&S) 451, H451, 651 Newman Seminar and Lecture Series in Natural Resources Engineering 1(0,2) See B E 451.

FOR 460, 660 Silviculture I 3(2,3) Discussion of the theory and practice of establishing, maintaining, and harvesting forest stands in accordance with ecological and economic principles. *Preq:* FOR 206 and Forestry Summer Camp or consent of instructor.

FOR H461 Silviculture Honors Seminar I 1(1,0) In-depth exploration of topics and problems presented in FOR 460. To earn honors credits, students must be enrolled in corequisite FOR 460 and earn a *B* or higher in both courses. *Preq:* Junior standing and approval of Department of Forest Resources. *Coreq:* FOR 460.

FOR 462, 662 Silviculture II 3(2,3) Discussion of forest management practices that affect ability of the land to produce multiple forest resources, with emphasis on water, nutrients, and fire. *Preq:* FOR 401 or consent of instructor.

FOR H463 Silviculture Honors Seminar II 1(1,0) In-depth exploration of topics and problems presented in FOR 462. To earn honors credit, students must be enrolled in corequisite FOR 462 and earn a *B* or higher in both courses. *Preq:* Junior standing and approval of Department of Forest Resources. *Coreq:* FOR 462.

FOR 480 Selected Topics in Urban Forestry 1-3(1-3,0) Study of selected and varied topics, problems, and issues in urban forestry and arboriculture through readings, class discussion, and individual and group projects. *Preq:* FOR (HORT) 427.

FOR H491 Senior Honors Thesis I 3(3,0) Individual forestry research for students in the Forestry Honors program that focuses on developing a plan of research under the direction of a faculty advisory committee. *Preq:* Senior standing, participation in Honors Program, and approval of Department of Forest Resources.

FOR H492 Senior Honors Thesis II 3(3,0) Individual forestry research for students in the Forestry Honors program that focuses on data collection, analysis, report writing, and oral presentation. *Preq:* FOR H491.

FRENCH

Professors: J. C. Bednar, D. J. Calvez, M. Cranston, K. M. Szmurlo; *Associate Professor:* D. Lepetit; *Assistant Professor:* C. B. Borne; *Instructor:* R. R. Willingham; *Visiting Associate Professor:* B. Agostini; *Lecturer:* B. M. Ginestet-Levine

FR 101 Elementary French 4(3,1) Multimedia course for beginners that combines video, audio, and print to teach the fundamentals of the French language and culture. Emphasis is on communicative proficiency (listening comprehension and speaking, reading, and writing).

FR 102 Elementary French 4(3,1) Continuation of FR 101; three hours a week of classroom instruction and one hour a week in the language laboratory.

FR 121 Intensive Elementary French 8(6,2) Intensive multimedia course for beginners which combines the content of FR 101 and FR 102 in one semester. May not be taken by students who have completed FR 101 or 102.

FR 151 French for Graduate Students 3(3,0) Intensive program only for graduate students preparing for the reading examination in French. A minimum grade of *B* on a final examination will satisfy graduate school foreign language requirement. May be repeated once for credit. To be taken Pass/Fail only. *Preq:* Graduate standing.

FR 201, H201 Intermediate French 3(3,0) Brief review of FR 101 and 102, with conversation, composition, and dictation, and the beginning of more serious reading of French prose. Includes literary and cultural perspectives. *Preq:* FR 102.

FR 202, H202 Intermediate French 3(3,0) Emphasis on reading nontechnical French prose more rapidly. Writing, speaking, and listening skills continue to be developed. Includes literary and cultural perspectives. *Preq:* FR 201.

FR 221 Accelerated French II 6(6,0) Accelerated intermediate course that can be taken in lieu of FR 201 and 202. Through conversation, composition, and intensive grammar review, proficiency is stressed. Includes literary readings and cultural perspectives. May not be taken by students who have completed FR 201 or 202. *Preq:* FR 102, 121 or consent of department chair.

FR 299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a total of three credit hours. *Preq:* Consent of instructor directing the play.

FR 300 Survey of French Literature 3(3,0) Study of selected masterpieces of French literature in their artistic, cultural, and historical context. May include theme and genre studies. *Preq:* FR 202 or consent of department chair.

FR 305 Intermediate French Conversation and Composition I 3(3,0) Practice in the spoken language, with stress on vocabulary building, pronunciation, intonation, and comprehension; written work to increase accuracy; assignments in the language laboratory. *Preq:* FR 202 or consent of department chair.

FR 307 French Civilization 3(3,0) Study of significant aspects of French culture from its origins to the present. *Preq:* FR 202 or consent of department chair.

FR 309 French Linguistics 3(3,0) Study of the fundamental structures of the French language: phonetics, syntax, and semantics. *Preq:* FR 202 or consent of department chair.

FR 312 Writing in French I 3(3,0) Study of the vocabulary, syntax, and stylistics in short compositions and creative papers in French, on both fiction and non-fiction topics. *Preq:* FR 202 or consent of department chair.

FR 316 French for International Trade I 3(3,0) Spoken and written French common to the French-speaking world of business and industry, with emphasis on business practices and writing and translating business letters and professional reports. Cross-cultural references provide opportunity for comparative and contrastive analyses of American and French cultural patterns in a business setting. *Preq:* FR 202, 305 (or concurrent enrollment); or consent of department chair.

FR 317 Contemporary French Civilization 3(3,0) Study of significant aspects of France today; the country, its economy, government, society. Taught in French. *Preq:* FR 202 or consent of department chair.

FR (PO SC) 383 French Foreign Language News 1(1,0) See PO SC 383.

FR (PO SC) 386 Topical Issues in French 1(1,0) See PO SC 386.

FR H391 Survey of French Literature (Honors) 1(1,0) One-hour independent study to allow honors students to pursue supervised research on a topic relating to the literary, cultural, and artistic movement in France. *Coreq:* FR 300, membership in Calhoun Honors College Program.

FR 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in French literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

FR 400 Modern French Literature 3(3,0) Study of selected works of twentieth-century French literature in their artistic, cultural, and historical context. *Preq:* FR 202 or consent of department chair.

FR 406 Nineteenth-Century French Literature 3(3,0) Study of selected works of nineteenth-century French literature in their artistic, cultural, and historical context. *Preq:* FR 300 or consent of department chair.

FR 407 Eighteenth-Century French Literature 3(3,0) Selected readings in French literature of the Enlightenment with emphasis on the social and intellectual context of the age. *Preq:* FR 300 or consent of department chair.

FR 408 Seventeenth-Century French Literature 3(3,0) Major literary figures, themes, and forms of 17th-century French literature. *Preq:* FR 300.

FR 409 Writing in French II 3(3,0) Intensive study of syntax and stylistics through composition and translations. *Preq:* Senior standing or consent of department chair.

FR 410 Francophone Literature 3(3,0) Study of selected works of francophone literature, with an emphasis on Africa and the Caribbean, in their artistic, cultural, historical, and political contexts. *Preq:* FR 300 or consent of department chair.

FR 411 Advanced French Conversation and Composition 3(3,0) Continuation of FR 305, with emphasis on greater fluency and sophistication in oral and written expression. *Preq:* FR 305 or consent of instructor.

FR 416 French for International Trade II 3(3,0) Study of language and cultural environment of the French-speaking markets of the world, including the linguistic and cultural idioms which support global marketing in general and the international marketing of textiles, agricultural products, and tourism in particular. *Preq:* FR 316.

FR 417 The French Corporation 3(3,0) Examination of the organization, structure, functioning, and economic role of the French business enterprise. *Preq:* FR 316 or consent of department chair.

FR H438 French Honors Research 3(3,0) Individual honors research conducted under direction of the Language Department faculty. *Preq:* Junior standing and membership in Calhoun Honors College Program.

FR H439 French Honors Thesis 3(3,0) Individual honors research conducted and thesis completed under direction of Language Department faculty member. *Preq:* Junior standing, FR H438, membership in Calhoun Honors College Program.

FR H491 Modern French Literature (Honors) 1(1,0) Independent study to allow honors students to pursue in depth an author, work, movement, or genre related to contemporary French culture, art, or literature. *Coreq:* FR 400, membership in Calhoun Honors College Program.

FR H492 The French Corporation (Honors) 1(1,0) Independent study to allow honors students to pursue an in-depth study of the organization, structure, functions, and economic role of a French business enterprise. *Coreq:* FR 417, membership in Calhoun Honors College Program.

FR 498 Independent Study 1-3(1-3,0) Directed study of selected topics in French literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

FR 499, 699 Selected Topics in French Literature 3(3,0) Selected topics that have characterized French literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

GENETICS

Professors: A. G. Abbott, W. C. Bridges, Jr., T. M. Brown, W. D. Graham, Jr., R. H. Hilderman, H. T. Knap, J. S. Rice, E. R. Shipe; *Associate Professors:* W. V. Baird, D. A. Kluepfel, W. R. Marcotte, Jr., N. H. Walker, R. A. Wing

GEN 302, H302 Introductory Genetics 4(3,3) Basic course introducing fundamental principles of inheritance in prokaryotes and eukaryotes. Emphasis is given to Mendelian genetics, physical and chemical basis of heredity, population genetics, and microbial genetics. *Preq:* BIOL 104 and one semester of biochemistry, or BIOL 110, or consent of instructor.

GEN (BIOSC) 416, 616 Recombinant DNA 3(3,0)S Familiarizes students with the most current facts and concepts of molecular genetics. Lectures focus on gene organization, structure, and expression in prokaryotes and eukaryotes, highlighting current technologies and research in these areas. *Preq:* GEN 302 or equivalent and one semester of biochemistry or consent of instructor. A developmental biology course is also strongly recommended.

GEN (BIOSC, MICRO) 418, 618 Biotechnology I: Nucleic Acids Techniques 4(2,4) See BIOSC 418.

GEN 451, 651 Advanced Genetics 3(3,0)F Advanced study of the principles of general genetics. Topics emphasized are variations in chromosome number and structure, natural and induced mutations, extranuclear inheritance, recombination, control of gene activity, genes and development, genetics of behavior patterns, population genetics, systems of mating, genetics and man. *Preq:* GEN 302 or equivalent.

GEN (ENT) 495, 695 Insect Biotechnology 3(3,0) See ENT 495.

GEOGRAPHY

Professor: G. W. Burnett; *Associate Professor:* J. A. Miller; *Assistant Professor:* C. A. Smith; *Visiting Assistant Professor:* L. F. Howard

GEOG 101 Introduction to Geography 3(3,0) Survey of the nature of geography, with emphasis on the discipline's organizing themes of earth science, relations between people and their environments, interrelations between places, locational analysis, and area studies.

GEOG 103 World Regional Geography 3(3,0) Systematic and descriptive survey of the major regions of the world, including their physical and cultural features. Provides a global context for courses in the social sciences and humanities.

GEOG 106 Geography of the Physical Environment 4(3,3) Examines the condition of the physical environment, especially the earth's surface and the processes that act on it. Topics range from earth-sun relations to the evolution of landscapes; human habitats and human alteration of the environment.

GEOG 301 Political Geography 3(3,0) Geographic basis of states: sovereignty, territory, power within states, relations between states. The geography of international affairs. *Preq:* GEOG 101 or 103 or permission of instructor.

GEOG 302 Economic Geography 3(3,0) Spatial analysis of economic activity, with an emphasis on regional economics and development. Topics include world population; technology and economic development; principles of spatial interaction; and geography of agriculture, energy manufacturing, and tertiary activities. *Preq:* GEOG 101 or 103 or permission of instructor.

GEOG 303 Urban Geography 3(3,0) Historical and contemporary survey of the urban world, with particular attention paid to the relationship between people and urban places. Topics include the rise of cities, urban hierarchies, urban land use, and the social geography of cities. *Preq:* GEOG 101 or 103 or permission of instructor.

GEOG 305 Cultural Geography 3(3,0) Broad examination of the basic cultural variables in the human occupation of the earth. Ecological, spatial, regional, and historical approaches; topics vary but may include cultural areas and distributions, cultural change, cultural landscape, and cultural ecology. *Preq:* GEOG 101 or 103 or permission of instructor.

GEOG 306 Historical Geography 3(3,0) Exploration of geographical change and the varied patterns of past human activities and people's relationships with the physical environment. Case studies from around the world are used to emphasize key themes in historical geography. Not open to students who have taken GEOG 102 or 220. *Preq:* GEOG 101 or 103 or consent of instructor.

GEOG 330 Geography of the Middle East and North Africa 3(3,0) Thematic survey of a world region extending from Morocco to Afghanistan. Emphasis is on climate, environment, social geography, historical development of the regional culture of Islam, and common problems facing the area today. *Preq:* GEOG 101 or 103, or permission of instructor.

GEOG 340 Geography of Latin America 3(3,0) Introduction to the physical, economic, political, and human/cultural geography of Latin America. Special focus on regional unity and diversity and the historical interaction of man and environment.

GEOG 360 Geography of Tropical Africa 3(3,0) Study of how tropical, or sub-Saharan, Africa functions in the modern world. Africa's physical environments, peoples and cultures, colonial and postcolonial history, and ideologies of economic development. Five basic themes are covered: population, natural resources, environmental quality, political organization, economic development. *Preq:* GEOG 101 or 103 or consent of instructor.

GEOG 401, 601 Studies in Geography 3(3,0) Intensive study of the geography of a selected world region, such as North America, Europe, or the Middle East, or the geography of a topic, such as the geography of oil or the geography of underdevelopment. May be repeated once for credit with departmental consent. *Preq:* GEOG 101 or 103 or consent of instructor.

GEOG 410, 610 Geography of the American South 3(3,0) Study of the geography of the American South in its changing complexities across almost 400 years of development. *Preq:* GEOG 101 or 103 or consent of instructor.

GEOG 420, 620 Historical Geography of the United States 3(3,0) Survey that places the spatial concepts of geography into a time sequence with special emphasis upon the United States. *Preq:* GEOG 101 or 103 or consent of instructor.

GEOG (PRTM) 430, 630 World Geography of Parks and Equivalent Reserves 3(3,0) See PRTM 430.

GEOG 499 Independent Study in Geography 3(3,0) Study of selected topics in geography under the direction of a faculty member chosen by the student. Student and faculty member develop a course of study designed for the individual student and approved by the department chair prior to registration.

GEOLOGY

Professors: B. E. Davies, R. W. Falta, Jr., J. R. Wagner, R. D. Warner, *Chair*; *Associate Professor:* R. A. Christopher; *Assistant Professors:* S. E. Brame, *Research Associate*; J. W. Castle, L. C. Murdoch, P. M. Reppert; *Lecturers:* L. B. Krause, J. L. Tinsley, R. D. White; *Visiting Assistant Professor:* M. W. Cain; *Visiting Instructor:* J. L. Janssen

GEOL 100 Current Topics in Geology 1(1,0) Lectures and demonstrations covering topics of current interest in the different fields of geology. Recent research developments and career opportunities in the geosciences are emphasized.

GEOL 101, H101 Physical Geology 3(3,0) Study of the minerals and rocks which compose the earth's crust, their origins and transformations. Emphasis is on geological processes, both internal and external, by which changes are produced on or in the earth.

GEOL 102 Historical Geology 4(3,3) Survey of the earth's geologic history emphasizing how the continents and ocean basins have evolved through geologic time. Evolution of life from the beginning of the fossil record through the present; identification of fossil plants and animals and interpretation of earth's past through study of geologic maps. Field trips illustrate principles. *Preq:* GEOL 101, 103.

GEOL 103, H103 Physical Geology Laboratory 1(0,2) Laboratory to accompany GEOL 101. Instruction is provided in the identification of minerals and rocks and in the interpretation of geologic processes through study of topographic maps. Field trips provide direct observation of processes and results. *Coreq:* GEOL 101.

GEOL 112 Earth Resources 3(3,0) Survey of earth's mineral, energy, water, and land resources, and environmental and societal impacts associated with the use of these resources. *Preq:* GEOL 101.

GEOL 114 Earth Resources Laboratory 1(0,2) Laboratory to accompany GEOL 112. Instruction is provided in the identification of ore and gem minerals and of other earth materials of economic importance. Land and water resources are explored through the use of topographic maps, aerial photographs, remotely sensed images, and field trips. *Preq:* GEOL 103. *Coreq:* GEOL 112.

GEOL 210 Geology of the National Parks 3(3,0) Survey of selected national parks and monuments emphasizing the dynamic geological processes which have shaped the landscapes of these areas. Special attention is focused on parks exhibiting recent geological activity related to volcanoes, earthquakes, and glaciers. Slides and films are used to highlight specific geological features.

GEOL (ASTR) 220 Planetary Science 3(3,0) Survey of the formation and evolution of planetary bodies. Emphasis is on the origin of planetary material and comparative study of the primary processes operative on planetary surfaces. Major features of the planets and moons in our solar system, as revealed by recent space missions, are described.

GEOL 300, H300 Environmental Geology 3(3,0) Discussion-oriented introductory study of the relationships of man to his physical surroundings and problems resulting from upsetting the established equilibria of geologic systems; man's role as a geologic agent, environmental conservation and management. *Preq:* GEOL 101 or consent of instructor.

GEOL 302, H302 Structural Geology 4(3,3) Diverse geological structures of the earth, their description, origin, and field recognition. Practical problems in interpreting geologic structures are utilized, in addition to theoretical considerations of the mechanics and causes of tectonism. *Preq:* GEOL 102 or consent of instructor.

GEOL 306 Mineralogy 4(3,3) Introduction to fundamental concepts of crystallography, crystal chemistry, and mineral optics. Topics include crystal symmetry, principles of crystal structures, composition and stability of minerals, and optical properties. Laboratory exercises emphasize recognition of crystallographic features, identification of minerals from their physical properties, and introduction to study of minerals with polarizing microscope. *Preq:* GEOL 101, 103 or consent of instructor.

GEOL 310 Optical Mineralogy 3(1,5) Involves techniques of mineral identification with polarizing microscope. Criteria are provided for the determination of optical properties using oil immersion grain mounts. Students are also introduced to the study of minerals and rocks in thin section. Lecture topics explore mineral optics theory. *Preq:* GEOL 306.

GEOL 314 Sedimentary Petrology 3(2,3) Origin, composition, and texture of sediments and sedimentary rocks, including both siliciclastic and chemical varieties. Interpretation of tectonic settings, depositional systems, facies relationships, and diagenesis. Laboratory involves description and classification of hand specimens and thin sections and analytical methods. *Preq:* GEOL 306 or consent of instructor.

GEOL 316, H316 Igneous and Metamorphic Petrology 3(2,3) Classification, occurrence, and origin of igneous and metamorphic rocks. Discussion of the chemical and physical processes involved in magmatic crystallization and metamorphism. Laboratory study of igneous and metamorphic rocks in hand specimen and thin section. Not open to students who have received credit for GEOL 309. *Preq:* GEOL 306, 310 or consent of instructor.

GEOL 318 Introduction to Geochemistry 3(3,0) Introduction to distribution of elements in the core, mantle, and crust of the earth. Control of rock type on trace element content in soils and sediments. Weathering, soil and regolith formation, water-sediment interrelations; solubility, mobility and bioavailability in relation to redox, pH and complexation; biogeochemical cycles of selected elements. *Preq:* GEOL 101 and CH 102 or consent of instructor.

GEOL 320, H320 Engineering Geology 3(3,0) Application of engineering principles to geologic problems. Identification of important material properties and mechanics of earth materials. Techniques of geologic site evaluation with emphasis on civil works and construction projects. *Preq:* GEOL 101, 103, MTHSC 108, PHYS 122.

GEOL 375 Bahamian Field Study 3(1,4) Relationships among marine sediment types, physical processes, and biological activity are observed. The world's third largest barrier reef is examined. Students stay one week at a field station on Andros Island in the Bahamas and travel by van and boat to various sites. Additonal fees are required. *Preq:* GEOL 101 or consent of instructor.

GEOL 401, 601 Applied Geophysics 3(2,2) Introduction to the most important methods of geophysical exploration and their application to the investigation of subsurface groundwater and mineral resources. Emphasis is on the principles, techniques, interpretations and limitations of magnetic, gravimetric, electrical, electromagnetic, well-logging, and seismic geophysical surveys. *Preq:* GEOL 101 or consent of instructor; PHYS 208 or 221 recommended.

GEOL 403, 603 Invertebrate Paleontology 3(2,3) Study of life of past geologic ages as shown by fossilized remains of ancient animals, with emphasis on the invertebrates. *Preq:* GEOL 101 or consent of instructor.

GEOL 405, 605 Geomorphology 3(2,3) Study of the surface features of the earth—their form, nature, origin, development, and rates and patterns of changes they are undergoing. Laboratory studies emphasize a process approach to terrain analysis stressing complex interactions of geologic, climatic, and tectonic forces. *Preq:* GEOL 101, 102, or consent of instructor.

GEOL 408, 608 Geohydrology 3(3,0) Study of the hydrologic cycle, aquifer characteristics, theory of groundwater movement, mechanics of well flow, experimental methods, and subsurface mapping. *Preq:* GEOL 101,102.

GEOL 411, H411 Research Problems 1-3(0,3-9) Field, laboratory, or library study of an approved topic in geology. Topic would be one not normally covered in formal courses, but may be an extension of a course. Taught either semester and may be repeated for a maximum of six credits. *Preq:* Senior standing or consent of instructor.

GEOL 413, 613 Stratigraphy 3(2,2) Analysis of stratified rocks as the repository of earth history and the conceptual framework used to synthesize the world geologic record as a coherent whole. Emphasis is placed not only on traditional lithostratigraphy but also on modern seismic stratigraphy, biostratigraphy, magnetostratigraphy, and current stratigraphic issues. *Preq:* GEOL 314 or consent of instructor.

GEOL 415 Analysis of Geological Processes 3(3,0) Introduction to methods for analyzing geological processes. Mathematical methods are introduced to solve problems related to stream flow, reaction kinetics, radioactive decay, heat flow, diffusion, fluid flow through geologic media and related processes. *Preq/Coreq:* MTHSC 206 or consent of instructor.

GEOL 451, 651 Selected Topics in Hydrogeology 1-4(1-3,0-3) Selected topics in hydrogeology, with emphasis on new developments in the field. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* GEOL 300 or 408, or consent of instructor.

GEOL 475 Summer Geology Field Camp 6(4,6) Introduction to field techniques emphasizing methods applied to hydrogeology. Description and mapping of hydrogeologic units and structures using outcrop data and lithologic and geophysical well logs. Construction of potentiometric maps from water level data. Performance of pumping tests on mapped aquifers and analysis of data to determine aquifer characteristics. *Preq:* GEOL 302 and 306, or consent of instructor.

GERMAN

Professors: J. M. Melton, H. M. Riley, M. M. Sinka; *Assistant Professors:* G. J. Love, J. Schmidt

GER 101 Elementary German 4(3,1) Course for beginners in which, through conversation, composition, and dictation, the fundamentals of the language are taught and a foundation is provided for further study and the eventual ability to read and speak the language. Three hours a week of classroom instruction and one hour a week in the language laboratory.

GER 102 Elementary German 4(3,1) Continuation of GER 101; three hours a week of classroom instruction and one hour a week in the language laboratory.

GER 151 German for Graduate Students 3(3,0) Intensive program only for graduate students preparing for the reading examination in German. A minimum grade of *B* on a final examination will satisfy graduate school foreign language requirement. May be repeated once for credit. To be taken Pass/Fail only. *Preq:* Graduate standing.

GER 190 Study and Travel Abroad Preparation 1(1,0) Prepares students for study/travel in German-speaking countries. Students are sensitized to cross-cultural differences and are provided with practical skills and sources of information. Taught mainly in English. To be taken Pass/Fail only.

GER 201, H201 Intermediate German 3(3,0) Brief review of GER 101 and 102, with conversation, composition, and dictation, and the reading of more serious German prose in short stories and plays. Includes literary and cultural perspectives. *Preq:* GER 102.

GER 202, H202 Intermediate German 3(3,0) Emphasis on reading nontechnical German prose more rapidly. Writing, speaking, and listening skills continue to be developed. Includes literary and cultural perspectives. *Preq:* GER 201 or consent of instructor.

GER 299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign language drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a total of three credits. *Preq:* Consent of instructor directing the play.

GER 301 Twentieth-Century German Drama 3(3,0) Selected works from major German-speaking dramatists of the 20th century, including Brecht, Duerrenmatt, and Frisch. Required of German majors. *Preq:* GER 202 or consent of department chair.

GER 302 Twentieth-Century German Prose and Poetry 3(3,0) Selected prose and poetry from major 20th century German-speaking authors, including Rilke, Mann, Hesse, Kafka, and Boell. Required of German majors. *Preq:* GER 202 or consent of department chair.

GER 305 Intermediate German Conversation and Composition 3(3,0) Practice in the spoken language, with emphasis on vocabulary, pronunciation, and comprehension; written exercises for accuracy. Required of German majors. *Preq:* GER 202 or consent of department chair.

GER 308 German Civilization 3(3,0) Study of significant aspects of the culture of the German-speaking peoples from their origins to 1945. *Preq:* GER 202 or consent of department chair.

GER 309 Modern German Culture 3(3,0) Study of modern German culture from 1945 to the present with particular emphasis on the Federal Republic of Germany and significant aspects pertaining to the German Democratic Republic. *Preq:* GER 202 or consent of department chair.

GER 310 Summer Immersion Program 6(6,0) Conducted entirely in German for eight hours daily. Program consists of activities that combine interrelating cultural topics with language skill practice. Frequent opportunities to converse with native speakers during meals and on excursions. Students receive six credits, three of which may be taken in lieu of 202. *Preq:* GER 201.

GER 316 German for International Trade I 3(3,0) Spoken and written German common to the German-speaking world of business and industry, with emphasis on business practices and writing and translating business letters and professional reports. Cross-cultural references provide opportunity for comparative and contrastive analysis of American and German cultural patterns in a business setting. *Preq:* GER 251 or 202 and 305 (or concurrent enrollment); or consent of department chair.

GER (PO SC) 384 German Foreign Language News 1(1,0) See PO SC 384.

GER (PO SC) 387 Topical Issues in German 1(1,0) See PO SC 387.

GER 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in German literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

GER 400 Goethe and His Age 3(3,0) Study of the most significant period of German literature, with readings from works by Goethe, Schiller, and the Romantics. Supplementary materials may include audio visuals and documents on the music, art, and science of the period. Recommended for German majors. *Preq:* GER 301, 302, or consent of department chair.

GER 401 Studies in German Literature I 3(3,0) Selected topics in German literature from the beginning to 1832. *Preq:* GER 301, 302, or consent of department chair.

GER 402 Studies in German Literature II 3(3,0) Study of selected topics in 19th or 20th century German literature. *Preq:* GER 301, 302, or consent of department chair.

GER 403 Studies in German Literature III 3(3,0) Study of a major theme in German literature within a chosen time period or in the work of one major author. Themes may be subject- or genre-oriented. *Preq:* GER 301, 302, or consent of department chair.

GER 411 Studies in the German Language I 3(3,0) Advanced training in the spoken and written language with emphasis on vocabulary, syntax, and stylistics. *Preq:* GER 305 or consent of department chair.

GER 412 Studies in the German Language II 3(3,0) In-depth study of terminology and syntax for specific subject areas in business, in the liberal arts, and in the sciences. *Preq:* GER 301, 302, 305, or consent of department chair.

GER 413 Studies in German Culture 3(3,0) Intensive study of selected topics concerning cultural phenomena of the German-speaking nations. *Preq:* GER 301, 302, 305, or consent of department chair.

GER 416 German for International Trade II 3(3,0) Study of language and cultural environment of the German-speaking markets of the world, including linguistic and cultural idioms which support global marketing in general and the international marketing of textiles, agricultural products, and tourism in particular. *Preq:* GER 316.

GER 417 German for International Trade III 3(3,0) Examination of the cultural and economic aspects of reconstructing eastern Germany's economy since the 1990 German unification. *Preq:* One German course at the 300 level or consent of department chair.

GER 498, 698 Independent Study 1-3(1-3,0) Supervised study of selected topics in German literature, language, or culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

GRAPHIC COMMUNICATIONS

Professors: S. T. Ingram, J. M. Leininger, E. L. Weir, W. E. West, *Chair*; *Assistant Professor:* J. B. Simmons, R. M. Snyder, E. M. Weisenmiller; *Instructors:* E. D. Gilbert, N. W. Leininger, G. R. Oliver, P. G. Rose; *Lecturers:* R. M. Carter, K. K. Osborne, F. C. Porcher, Jr., J. D. Scroggs; *Visiting Professors:* J. P. Crouch, F. T. Simon; *Adjunct Professor:* S. Edlein; *Adjunct Associate Professor:* L. W. Evans

G C 101 Orientation to Graphic Communications 1(1,0) Introduction to the curriculum and the industry including its processes, products, and careers. Emphasis is placed on the attributes which are most desirable for successful entry and advancement up a variety of career ladders.

G C 104, H104 Graphic Communications I 4(2,6) Emphasis on basic graphic arts industrial concepts, principles, and practices, with laboratory applications in photography, layout and design, conventional and electronic copy preparation, reproduction photography, offset lithography, screen printing, and finishing operations. Flexography, gravure, letterpress and specialty printing processes are also covered, along with environmental, health, and safety concerns.

G C 207, H207 Graphic Communications II 3(1,6) Continuation of G C 104. Intermediate course for graphic communications and graphic arts specialists which broadens skills and technical knowledge in areas of layout, copy preparation, reproduction photography, film assembly, screen printing, lithographic presswork, and finishing. *Preq:* G C 101, 104, typewriter/computer keyboarding skills of 20 net words per minute.

G C 215, H215 Photographic and Digital Imaging Techniques 3(1,6) Emphasizes application of black and white and color imaging by photographic and digital technologies. Laboratory experiences assure confidence in the use of photographic and digital techniques for creating and enhancing original images for graphic reproduction and distribution.

G C 245 Graphic Communications Mechanical Systems 3(2,3) Concepts in mechanical systems and their controls as related to equipment and facilities in graphic communications industrial manufacturing. G C 207 and THRD 180 or permission of instructor.

G C 310, H310 Alternative Approaches to Imaging 4(2,6) Promotes the refining of skills learned in G C 104 and 207, with an in-depth study and application of computerized pre-press systems and methodologies. Serves as a transition course to the advanced graphic classes teaching offset lithography, flexography, screen printing, and gravure. *Preq:* G C 207, 215, or consent of instructor.

G C 350 Graphic Communications Internship I 1(0,3) Full-time supervised employment in an industrial in-plant setting for expansion of experience with materials and processes, production people, and organizations. *Preq:* G C 104 or equivalent, consent of instructor. *Coreq:* CO-OP 101.

G C 405, H405, 605 Package and Specialty Printing 2(2,0) Problems and processes for printing and converting in package, label, and specialty printing industries. Flexographic preparation, printing, die making, diecutting, transfer printing, screen container printing, pad printing, and bar code production are covered. New developments and trends are discussed. To be taken concurrently with G C 406. *Preq:* G C 245, 310, 350; or consent of instructor.

G C 406, H406, 606 Package and Specialty Printing Laboratory 2(0,6) Laboratory in techniques for printing and converting in package, label, and specialty printing industries. Experiences in flexographic prepress; printing; die design, die making and diecutting for label, folding cartons and corrugated; and glass, plastic, and metal container printing. *Preq:* G C 245, 310, 350; concurrent enrollment in G C 405; or permission of instructor.

G C 407, 607 Advanced Flexographic Methods 4(2,6) In-depth study of the methods used in flexographic printing and converting of porous and nonporous substrates. Theory and laboratory applications include setting standards for process color, preparation of plate systems, ink mixing and color matching, testing of films and foils, analysis of recent developments, and prediction of future markets. *Preq:* G C 406 or consent of instructor.

G C 440, H440, 640 Commercial Printing 5(2,9) Advances skills learned in previous graphic communications courses and applies the knowledge to large format presses. Students work from the design conception stage through all aspects of preparation, production, and finishing. Emphasis is placed on understanding and incorporating emerging technologies into the production work-flow. *Preq:* G C 310 and 350 or consent of instructor.

G C 444, H444, 644 Current Developments and Trends in Graphic Communications 4(2,6) Advanced course for Graphic Communications majors. Emphasis is on the theory and technical developments that affect process and equipment selection. Topics include color theory and application, electronic color scanning, electronic prepress and communications, gravure color quality control and analysis. *Preq:* G C 405, 406, 440.

G C 445, 645 Advanced Screen Printing Methods 3(2,3) In-depth study of the systems and materials used with the screen printing process. Emphasis is placed on techniques of control and procedures for establishing screen printing methods and standards. *Preq:* G C 207 or consent of instructor.

G C 446, 646 Ink and Substrates 3(2,3) Covers components, manufacturing, process use as well as end use of ink and substrates used in lithography, flexography, gravure, and screen printing. Examines the interrelationship between inks, substrates, and the printing process. Through controlled testing and examination, optimum conditions for improved printability are determined. *Preq:* G C 405; 406 or 440; or consent of instructor.

G C 448, H448, 648 Planning and Controlling Printing Functions 3(3,0) Study of systems for setting printing production standards, estimating, scheduling, job planning, and the selection of new hardware and technologies. *Preq:* G C 405, 406, 440, 450.

G C 450 Graphic Communications Internship II 1(0,3) Continuation of G C 350. *Preq:* G C 350, 405; 406 or 440; consent of instructor. *Coreq:* CO-OP 102.

G C 451, H451 Special Projects in Graphic Communications 1-6(0,3-18) Advanced projects covering theory and/or practices going beyond the scope of regular coursework. Written project approval required before registering. May be repeated with advisor's approval. *Preq:* Junior standing, three graphic communications courses completed, or permission of instructor.

G C 455 Advanced Graphic Communications Internship 1(0,3) Full-time employment in an industry directly or indirectly related to printing. The work site and job must be approved in advance. *Preq:* G C 350.

G C 480 Senior Seminar in Graphic Communications 2(2,0) Study of current trends and issues in the graphic communications industry. Class centers around group discussions dealing with relevant topics facing the graphic communications manager today. Students are asked to draw upon academic experiences, internship experiences, and library research to facilitate discussion. Must be taken during the last semester on campus.

G C 490, 690 Graphic Communications Selected Topics 1-3 (1-3,0) Subjects not covered in other graphic communications courses; organized according to industry trends and student needs. May be repeated for a maximum of 18 credits, but only if different topics are covered. *Preq:* Consent of instructor.

GREAT WORKS

G W (ENGL) 301 Great Books of the Western World 3(3,0) Introduces Great Works minor. Includes readings about the Great Books concept, as well as various great books from the humanities, arts, and natural and social sciences. *Preq:* Sophomore literature (ENGL 207 or 208 strongly recommended).

G W 402 Great Works of Science 3(3,0) An understanding of science in terms of its history and its approach to problem-solving through study of selected great works. Emphasis is on developing students' abilities to reflect on the problems and methodologies encountered in the scientific method.

G W 403 Special Topics in Continental Literature 3(3,0) Important primary texts written in modern European languages are taught in English. Content varies according to instructor. *Preq:* Sophomore literature.

HEALTH

Associate Professors: G. E. Costello, *Chair;* D. B. Jackson, K. A. Kemper, C. T. Rainey; *Assistant Professors:* R. M. Mayo, W. W. Sherrill, H. D. Spitler; *Lecturers:* A. H. Abercrombie, K. M. Meyer; *Adjunct Professors:* T. E. Aldrich, M. M. Crane, J. A. Johnson, Jr., W. J. Jones; *Adjunct Assistant Professors:* P. S. Saha, S. R. Sprague

HLTH 201 History and Philosophy of Public Health and Medicine 2(2,0) Explores the evolution of public health and medicine, the social and technological factors and historical turning points in their development, the philosophies and major issues of public health and medicine including beliefs about the nature and causes of health and illness, and the protection and management of community health.

HLTH 202 Introduction to Public Health 3(3,0) Examination of the forces that have influenced current health delivery systems, health practices, and trends. General systems theory is introduced. Health majors and minors will be given enrollment priority.

HLTH 203 Overview of Health Care Systems 2(2,0) Introduction to the health care delivery system including public health and health care components. Examines and discusses individual and public expectations of need and demand for health care and delivery of public health and health care services.

HLTH 240 Determinants of Health Behavior 3(3,0) Analysis of health behaviors based on psychological, social, cultural, and environmental factors. Introduction to health behavior theories. Health majors and minors will be given enrollment priority. *Coreq:* HLTH 298 or consent of instructor.

HLTH 250 Health and Fitness 3(3,0) Study of interrelationship between health and fitness. Emphasis is on the cardiovascular system and benefits of exercise.

HLTH 298 Human Health and Disease 3(3,0) Study of good health practices. Emphasis is on lifestyles and measures of health. Health majors and minors will be given enrollment priority.

HLTH 301 Medications in Health 3(3,0) Exploration of use of medications in the maintenance of health, with emphasis on consumer responsibility and informed decision making. *Preq:* Two-semester sequence in science or consent of instructor.

HLTH 303 Communication in Health Systems 3(3,0) Introduction to medical terminology, composing health reports, and health-funding proposals and media communications. *Preq:* HLTH 298.

HLTH 305 Body Response to Health Behaviors 3(3,0) Positive benefits and the negative impact of certain behaviors at cellular, organ, and body-system levels are examined. The pathways of selected injury and disease are explored. Expected physiological changes are applied in identifying strategies for promoting health in the presence (or absence) of disease. Health majors and minors will be given enrollment priority. *Coreq:* BIOSC 223 or consent of instructor.

HLTH 310 Women's Health Issues 3(3,0) Exploration of specific health needs of women, with emphasis on understanding and preventing problems of women's health. Health majors and minors will be given enrollment priority. *Preq:* Two-semester sequence in science or consent of instructor.

HLTH 315 Social Epidemiology 3(3,0) Exploration of the current problems and issues associated with the health of population groups. The interrelationships of biological, socio-cultural, behavioral, environmental, political, and economic risk factors and the health and illness patterns of those in population groups are examined. *Preq:* HLTH 298, 380 or consent of instructor.

HLTH 320 Health Maintenance for Men 3(3,0) Exploration of specific health maintenance needs of men, with emphasis on understanding and preventing problems of men's health. Health majors and minors will be given enrollment priority. *Preq:* Two-semester sequence in science or consent of instructor.

HLTH 340 Health Promotion and Education 3(3,0) Application of learning, change, and group theories as interventions for health behaviors. *Preq:* HLTH 240, 298.

HLTH H341 Health Promotion Seminar 1(2,0) Seminar exploring in-depth topics and problems presented in HLTH 340, utilizing appropriate models, such as PRECEDE/PROCEED, to analyze health-promotion strategies. To earn honors credit, students must be enrolled in HLTH 340 and earn a *B* or higher in both courses. *Coreq:* HLTH 340.

HLTH 350 Medical Terminology and Communication 3(3,0) Skills in building, analyzing, defining, pronouncing, and spelling medical terms related to the human body are developed and applied through electronic communication. *Preq:* Junior standing or permission of instructor.

HLTH (AP EC, C R D) 361 Introduction to Health-Care Economics 3(3,0) See C R D 361.

HLTH 380 Epidemiology 3(3,0) Introduction to epidemiological principles and methods used in the study of the origin, distribution, and control of disease. Health majors and minors will be given enrollment priority. *Coreq:* Approved statistics course.

HLTH H381 Epidemiology Seminar 1(2,0) Provides students with the opportunity to use epidemiological principles and methods learned in HLTH 380 to analyze research findings and apply the findings to health promotion. To earn honors credit, students must be enrolled in the corequisite HLTH 380 and earn a *B* or higher in both courses. *Preq:* Approved statistics course. *Coreq:* HLTH 380.

HLTH 398 Health Appraisal Skills 1(0,3) Utilizes laboratory experiences to measure health risk, interpret laboratory health data, and design personal health programs. Restricted to Health Science majors. *Preq:* HLTH 298.

HLTH 400, 600 Selected Topics in Health 1-3(1-3,0) Topics selected to meet special and individualized interest of students in health. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Junior standing, consent of instructor.

HLTH 401, 601 Health Consumerism 3(3,0) Exploration of consumer decisions regarding health products and services with emphasis on strategies for decision making. Health majors and minors will be given enrollment priority. *Preq:* Two-semester sequence in science or consent of instructor.

HLTH 402 Principles of Health Fitness 3(3,0) Students apply current theories concerning physiological effects of exercise to select new populations; understand the relationship between exercise and various chronic diseases; and design, execute, and evaluate exercise programs in terms of safety and effectiveness. *Preq:* BIOSC 222; CPR certification. *Coreq:* BIOSC 223.

HLTH 410, 610 Concepts of Health for Children 3(3,0) Focus on the analysis and evaluation of health problems commonly occurring in children. Emphasis is on concepts of positive health behavior. Health majors and minors will be given enrollment priority. *Preq:* Developmental psychology requirement.

HLTH 411, 611 Health Needs of High Risk Children 3(3,0) Analysis and evaluation of health needs of high-risk families and special needs children from the prenatal period to age six. Emphasis is on health prevention and early intervention strategies. Early Intervention Specialist minors will be given enrollment priority. *Preq:* HLTH 410.

HLTH 415, 615 Public Health Issues in Obesity and Eating Disorders 3(3,0) In-depth review of prevalence, risk factors, consequences, and treatments of obesity and other eating disorders. Focuses on the public health importance of cultural norms, prevention, and early intervention related to obesity and eating disorders. *Preq:* Junior standing in Health Science or consent of instructor.

HLTH 419 Health Science Internship Preparation Seminar 1(1,0) Preparation for internship experience including topics such as résumé development, interviewing skills, internship agency selection, and responsibilities of student, department, and agency. *Preq:* HLTH 411; Early Intervention Specialist minor; Junior standing or consent of instructor.

HLTH 420, 620 Health Science Internship 1-9(0,3-27) On-the-job experiences under competent supervision in an approved agency. Students select an agency and develop personal goals and objectives appropriate to the setting, population, and health issues. May be repeated for a maximum of nine credits. To be taken Pass/Fail only. *Preq:* HLTH 419, minimum grade-point ratio of 2.0, Junior standing, and consent of instructor.

HLTH 430, 630 Health Promotion of the Aged 3(3,0) Focuses on analysis and evaluation of health issues and health problems of the aged. Emphasis is on concepts of positive health behaviors. Health majors and minors will be given enrollment priority. *Preq:* Developmental psychology; two-semester sequence in science; or consent of instructor.

HLTH 431, 631 Public and Environmental Health 3(3,0) Principles of environmental health, with emphasis on understanding various health concerns created by the interactions of people with their environment. Students evaluate the impact of environmental factors on public health policy decisions. Meets specific area of need in environmental health issues.

HLTH 440 Managing Health Service Organizations 3(3,0) Exploration of the role of the health professional as a leader and activist. Study of legal, ethical, economic, political, and agent roles. *Preq:* Junior standing or permission of instructor.

HLTH 450, 650 Applied Health Strategies 3(3,0) Students plan, implement, and evaluate strategies to promote health through individual behavior changes. Both healthful and unhealthful behaviors are included. Examples include smoking cessation, weight management, and stress management. Restricted to Health Science majors. *Preq:* HLTH 480.

HLTH 460 Health Information Systems 3(3,0) Focus on the application of information systems to patient care and management support systems. Provides a general understanding of how the information needs of health professionals and health service organizations can be met through the proper acquisition, storage, analysis, retrieval, and presentation of data.

HLTH 470 International Health 3(3,0) Deepens students' knowledge of global health and how public health work is conducted internationally. Introduction to assessment of international health needs and designing, implementing, managing, and evaluating public health programs in international settings. *Preq:* HLTH 298.

HLTH 475 Health Systems Research 3(3,0) Advanced training in health systems research methods, models, and objectives. Emphasizes methods of health systems research with quantitative data analysis, interpretation, and the application of results to health systems improvement. *Preq:* Senior standing in Health Systems Research concentration area.

HLTH 480 Community Health Promotion 3(3,0) Focus on health-promotion activities for community and population groups with emphasis on assessment, program planning, and evaluation. Restricted to Health Science majors. *Preq:* HLTH 340, 380, 398.

HLTH H481 Community Health Promotion Seminar 1(2,0) Students evaluate health-promotion strategies and differentiate theory and practice by examining classroom content and field experience. To earn honors credit, students must be enrolled in HLTH 480 and earn a *B* or higher in both courses. *Preq:* HLTH 340, H341. *Coreq:* HLTH 480.

HLTH 490 Research and Evaluation Strategies for Public Health 3(3,0) Discussion of research in health. Focus on analysis of reported research. Ethical, moral, and legal issues are discussed. *Preq:* EX ST 301, MTHSC 203, or 301.

HLTH H491 Research Internship 1(0,3) Students collaborate in on-going faculty research programs to gain an awareness of the research process and role in a unique mentoring environment. Students apply theories and principles learned in HLTH 490 as they mentor with faculty. To earn honors credit, students must be enrolled in HLTH 490 and earn a *B* or better in both courses. *Coreq:* HLTH 490.

HLTH 498, 698 Improving Population Health 3(3,0) Critical examination of current and emerging issues in improving public health practice and population health. Covers examples in empirical and applied research, revealing future trends in population health. Health Science majors and minors will be given enrollment priority. *Preq:* HLTH 240, 298, 380, or consent of instructor.

HLTH 499 Independent Study 1-3(1-3,0) Study of selected problems in health under the direction of faculty member chosen by the student. Student and faculty member develop a course of study designed for the individual student and approved by the department chair prior to registration. May be repeated for a maximum of three credits. *Preq:* Junior standing or consent of instructor.

HISTORY

Professors: J. L. Arbena, E. D. Carney, H. R. Grant, *Chair;* T. J. Kuehn, D. M. McKale, E. E. Moise, D. M. Nicholas, J. V. Reel, Jr., H. L. Suggs; *Associate Professors:* S. L. Barczewski, C. A. Grubb, P. E. Mack, S. G. Marks, R. L. Saunders, Jr., W. F. Steirer, Jr.; *Assistant Professors:* J. R. Andrew, Jr., L. C. Anthes, J. M. Burns, R. R. Owens; *Visiting Assistant Professor:* P. C. Anderson

HIST 100 Higher Education and Clemson 1(1,0) Introduction to higher education; its background and development in the western world, emphasizing land-grant institutions and Clemson University in particular.

HIST 101, H101 History of the United States 3(3,0) Political, economic, and social development of the American people from the period of discovery to the end of Reconstruction.

HIST 102, H102 History of the United States 3(3,0) Political, economic, and social development of the American people from the end of Reconstruction to the present.

HIST 122, H122 History, Technology, and Society 3(3,0) Topics in the history of technology with emphasis on how technology affects society and how society shapes technology. Emphasis is on 19th and 20th century America, but some material from other periods of Western Civilization and other world regions may be discussed.

HIST 172, H172 Western Civilization 3(3,0) Political, economic, and social movements of Western civilization from ancient times to the 17th century.

HIST 173, H173 Western Civilization 3(3,0) Political, economic, and social movements of Western civilization from the 17th century to the present.

HIST 198 Current History 1(1,0) Examination of the major events and problem areas in the news with emphasis on their historical context and possible long-range significance. May be repeated for a total of three credits. Does not count toward the requirements of the major or minor in History.

HIST 200 Fort Hill Internship 1(0,1) Provides practical experience in public history museum work and historical preservation. May be repeated for a maximum of three credits. Does count toward the major or minor in History. To be taken Pass/Fail only. *Preq:* Consent of department chair.

HIST 201 Prelaw Internship 3 SS Faculty-supervised internship in law firm or other legal setting. Introduces students who are interested in law school to the workings of the legal system. To be taken Pass/Fail only. *Preq:* History major or minor and HIST 328 or 329 (with consent of internship coordinator).

HIST 300 History of Colonial America 3(3,0) Development of American institutions and customs in the period before 1776. Considerable emphasis is placed on the imperial relations between Great Britain and her colonies and upon the movement towards and the philosophy of the American Revolution.

HIST 301 American Revolution and the New Nation 3(3,0) Study of the various historical explanations leading to an understanding of the American Revolution, the establishment of the Nation under the Constitution, and the first decade of the new nation. Special emphasis is on developing an understanding of individual motivation and ideological development present during the last four decades of the 18th century.

HIST 302 Age of Jefferson, Jackson, and Calhoun 3(3,0) Formation and growing pains of the new nation through the Federal and Middle periods of its history, with emphasis on economic and political development, the westward movement, and the conflicting forces of nationalism and sectionalism.

HIST 303 Civil War and Reconstruction 3(3,0) Study of the political, military, and social aspects of the sectional conflict and of the era of Reconstruction. Some emphasis is placed on the historical controversies which the period has inspired.

HIST 304 Industrialism and the Progressive Era 3(3,0) Study of American society in the period between the 1880s and 1930s. Emphasizes the effects of industrialization and urbanization on the American people.

HIST 305 The United States in the Age of the World Wars 3(3,0) Examination of the changes in the American experiences through two world wars, a depression, the Prohibition era, and the assumption of international responsibilities.

HIST 307 Recent America 3(3,0) Examination of the American experience from the end of World War II through the period of the Korean and Vietnam wars, the Cold War, the Civil Rights movement, the counter-culture of the 1960s, assassinations, and Watergate.

HIST 311 African Americans to 1877 3(3,0) Study of the African-American experience in the United States, from the African past through slavery to 1877.

HIST 312 African American History from 1877 to the Present 3(3,0) Study of African American experience in the United States, from 1877 to the present.

HIST 313, H313 History of South Carolina 3(3,0) Political, economic, and social development of South Carolina from 1670 to the present.

HIST 314 History of the South 3(3,0) [W.1] Origins and development of political, economic, and cultural institutions of the South from the Colonial period to the present and the role of the South in the nation's development.

HIST 316 American Social History 3(3,0) Study of American society, including the relationship among classes, ethnic groups, regions, and sexes, from the Colonial period to the present.

HIST 318 History of American Women 3(3,0) [W.2] Survey course of the history of American women emphasizing the changing role of women in American culture and society.

HIST 319 Women and Law in United States History 3(3,0) Survey of the legal status of women throughout United States history. Emphasis is on the relationship between legal rules and social conditions and the way in which law defined the status of women over time and helped change their status and rights.

HIST 321 History of Science 3(3,0) Survey of the development of science in the Western world, emphasizing the period from the Renaissance to the present.

HIST 322 History of Technology 3(3,0) History of the major developments in Western technology and their relationships to the societies and cultures in which they flourished.

HIST 323 History of American Technology 3(3,0) [W.1] History of developments in technology and their role in American life with particular emphasis on the American Industrial Revolution and the 20th century.

HIST 325 American Economic Development 3(3,0) Economic development of the United States from Colonial to recent times, emphasizing the institutional development of agriculture, banking, business and labor, and government regulations and policy.

HIST 327 American Business History 3(3,0) Survey of the history of American business using a case-study approach. Focus is on the effects that policies and institutions have on individual businesses.

HIST 328 United States Legal History to 1890 3(3,0) Survey of American legal system in its historical perspective from Colonial times to 1890. Emphasis is on the relationship between law and society, the way in which the practice of law changed American society, and the way in which social development affected both the theory and practice of the law.

HIST 329 United States Legal History Since 1890 3(3,0) Examination of the social, cultural, intellectual, economic, and political forces that have helped shape the law in the U. S. since 1890.

HIST 330 History of Modern China 3(3,0) Growth and development of Chinese civilization from ancient times to the present. Emphasis is on 20th century China, particularly since the rise to power of the Communist regime.

HIST 333 History of Modern Japan 3(3,0) Origin and development of Japanese civilization with particular emphasis on modern Japan from mid-19th century to the present.

HIST 334 Premodern East Asis 3(3,0) Introduction to histories of China and Japan, from antiquity to approximately 1850. Political, religious, artistic, and other aspects of premodern society are examined and compared in order to gain significant insights regarding the premodern antecedents of these two dynamic and important nations.

HIST 337 History of South Africa 3(3,0) Examines the important trends in the history of South Africa from earliest times to the present. Topics include nature of pre-colonial society, European immigration, rise of industrial capitalism, advent of Apartheid, and the liberation struggle.

HIST 338 African History to 1875 3(3,0) Study of sub-Saharan Africa from antiquity to European colonial rule, exploring the development of Stone Age cultures; agricultural and pastoral societies; ancient civilizations; political, economic, and social systems; gradual shift of initiative from the interior to the coast; and various slave trades.

HIST 339 Modern Africa, 1875 to the Present 3(3,0) Study of sub-Saharan Africa from 1875 to the present, with the focus placed upon the development and decline of European imperialism, dilemmas of African independence, and ethnic struggles in Southern Africa.

HIST 340 Ancient Americans 3(3,0) Introduction to the geography of the Western Hemisphere; origin of human life in the Americas; structure and accomplishments of the major pre-Columbian societies, with emphasis on the rise and decline of the Classic civilizations; the impact of the European conquest; the formation of a new Ibero-American culture.

HIST 341 Modern Mexico 3(3,0) Introduction to the geography of the region, origins, and progress of the Independence movements and political, economic, and social developments after 1825; current domestic and international problems.

HIST 342 South America Since 1800 3(3,0) Introduction to the geography of the region; origins and progress of the Independence movements; political, economic and social developments after 1825; current domestic and international problems.

HIST 351 Ancient Near East 3(3,0) History of the peoples and civilizations of the Near East from the Sumerians to the establishment of Roman power in this region. Geography, mythology, religious, and economic currents, as well as the methods and discoveries of archaeology are included.

HIST 352 Egypt in the Days of the Pharaohs 3(3,0) Egyptian civilization from its beginning until the period of Roman conquest. Includes a survey of political history, but also deals with daily life, making much use of archaeological evidence.

HIST 353 Women in Antiquity 3(3,0) Focuses on women in the ancient period in Mesopotamia, Israel, Egypt, Greece, Rome, and in the early Christian Church. Formation of gender roles and issues related to ancient sexuality also receive attention.

HIST 354 The Greek World 3(3,0) Study of Greek civilization from its beginning until the time of the Roman conquest, concentrating on the social institutions of the Greek city-states.

HIST 355 The Roman World 3(3,0) The rise of Rome to world empire and the international civilization it dominated. Concentration on the nature of the political change from Republic to monarchy with particular emphasis on city life and the causes of its decline.

HIST 361 History of England to 1688 3(3,0) [W.2] Evolution of English political, social, economic, and cultural institutions to the 17th century. (Study Abroad)

HIST 363 History of England Since 1688 3(3,0) Evolution of English political, social, economic, and cultural institutions from the 17th century to the present.

HIST 365 English Cultural History 3(3,0) [W.2] Survey of the cultural history of England, from Anglo-Saxon times to the present, focusing on the period after the English Renaissance.

HIST 370 Medieval History 3(3,0) Survey of the period from the eclipse of Rome to the advent of the Renaissance, emphasizing human migrations, feudalism, rise of towns, and cultural life.

HIST 372 The Renaissance 3(3,0) Examination of the transitional period of European civilization (ca. 1300–1500), with emphasis on institutional, cultural, and intellectual developments.

HIST 373 Age of the Protestant Reformation 3(3,0) [W.2] Evolution of Modern Europe (ca. 1500–1660), as affected by the Reformation, wars of religion, and growth of nation-states. Study includes intellectual advances and the beginnings of European expansion overseas.

HIST 374 Europe in the Age of Reason 3(3,0) Study of the quest for order and the consolidation of the European state system between 1660 and 1789 with emphasis on the idea of absolutism, the question of French hegemony, and the synthesis of the 18th-century Enlightment.

HIST 375 Revolutionary Europe 3(3,0) History of Europe from the outbreak of the French Revolution through the Revolutions of 1848, with emphasis on the conflict between the forces of change and those of conservatism, within the states and in Europe in general.

HIST 377 Europe, 1914–1945 3(3,0) Focus on Europe during two major wars and the peacetime adjustments Europeans made, or failed to make, during the twenty-year interim between those wars.

HIST 378 Europe Since 1945 3(3,0) Focus on how World War II completed the destruction of European global hegemony, creating a bipolar continent with the west dominated by the United States and the east by Soviet Russia; and how Europe adjusted to this situation.

HIST 380 Imperial Germany 3(3,0) German history from the beginning of the German Empire, 1870–71, through World War I. Emphasizes the influence of militarism, nationalism, anti-Semitism, and xenophobia on the German culture and political process.

HIST 381 Germany Since 1918 3(3,0) German history from the time of Germany's defeat in World War I, through the Nazi period and World War II. Culminates with the study of a divided Germany.

HIST 384 History of Modern France 3(3,0) French history from mid-19th century to the present with particular emphasis on France since 1900.

HIST 385 History of Imperial Russia 3(3,0) Survey of the formative years of the Russian Empire from the time of accession of Peter the Great to the time of the Russian Revolution. Social, political, diplomatic, and intellectual developments are given equal treatment.

HIST 386 History of the Soviet Union 3(3,0) Soviet history from the revolution to the present. Surveys the creation and subsequent development of the communist political and social system, with attention given to culture and diplomacy.

HIST 387 The Russian Revolution 3(3,0) [W.2] History of one of the most formative series of events of the 20th century. Follows the crisis of Imperial Russia, its downfall during World War I, and subsequent revolutionary upheaval leading to the formation of the USSR.

HIST 390 Modern Military History 3(3,0) Survey of the development of modern warfare and the influence of technological change on warfare. Particular attention is given to the major conflicts of the 20th century.

HIST 391 Post World War II World 3(3,0) The world in the age of the Cold War, the breakdown of the colonial empires, and racial, religious, ethnic, national, and social tensions. The United States provides the central core to the class.

HIST (F&RR) 392 History of the Environment of the United States 3(3,0) Examination of the historical development of the attitudes, institutions, laws, people, and consequences that have affected the environment of the United States from pre-Columbian days until the present. Emphasis is placed on the interaction of human beings within and with the environment.

HIST 393 Sports in the Modern World 3(3,0) Analysis of the global evolution and diffusion of sports in the industrial age, with an emphasis on the linkage of sports structure and performance to the larger social context.

With departmental consent, any 400- or 600-level course in history may be repeated once for credit. The 400-level courses require students to do historical research and writing.

HIST 400, 600 Studies in United States History 3(3,0) Topics and problems in the history of the United States from the Colonial era to the present.

HIST 428, 628 A Famous American Trial in History 3(3,0) Study of the social, cultural, and legal context of a famous American trial. Consideration is given to the actual trial record (transcripts, briefs, and opinions on appeal) and to historical studies of the time and place in which the trial arose. Trial selected varies. *Preq:* HIST 328 or 329 or consent of instructor.

HIST 436, 636 The Vietnam Wars 3(3,0) Wars in Vietnam are seen in two phases. The First Indochina War, 1946–54, is covered briefly. Main body of the course covers the Second Indochina War, which began as a guerrilla conflict in 1959–60 and ended as a mostly conventional war in the Communist victory of 1975.

HIST 438, 638 Problems in African Historiography and Methodology 3(3,0) Concentrates on major issues in the field of African history with an additional focus on methodological concerns.

HIST 440, 640 Studies in Latin American History 3(3,0) Consideration of selected and varied topics in Latin American history through readings, class discussions, and individual or group projects. Special attention is given to the use of an inquiry or problem-solving method of historical analysis and to the cultivation of a comparative perspective.

HIST 450, 650 Studies in Ancient History 3(3,0) Selected topics in ancient history ranging from pre-Biblical times to the fall of the Roman Empire.

HIST 451, 651 Alexander the Great 3(3,0) Focuses on the career of Alexander the Great and deals with the history and archaeology of ancient Macedonia.

HIST 460, H460, 660 Studies in British History 3(3,0) Examination of selected themes, topics, or periods in British history from Anglo-Saxon times to the present.

HIST 470, 670 Studies in Early European History 3(3,0) Study of selected topics or themes in European history from the fall of the Roman Empire to the age of industrialization.

HIST 471, H471, 671 Studies in Modern European History 3(3,0) Study of selected topics or problems in European history from the end of the Old Regime to the present.

HIST 490 Senior Seminar 3(3,0) Seminar in current research themes in history. Students do directed research on a particular topic. Seminar topics vary from section to section and from semester to semester. *Preq:* Senior standing or consent of instructor.

HIST 491, H491, 691 Studies in the History of Science and Technology 3(3,0) Selected topics in the development of science and technology, with emphasis on their social, political, and economic effects.

HIST 492, 692 Studies in Diplomatic History 3(3,0) Selected topics and problems in international conflict and conflict resolution among nations. Concentration is usually in 20th century history.

HIST 493, 693 Studies in Social History 3(3,0) Studies in the ways people have earned their livings and lived their lives, individually and as communities, in the confines of different societies.

HIST 494, 694 Studies in Comparative History 3(3,0) Selected topics in comparative history, contrasting and comparing similar historic developments in different nations, geographic areas, or civilizations.

HIST 495, 695 Studies in the History of Ideas 3(3,0) Selected topics and themes in the development of ideas that have had an impact on the behavior of individuals and civilizations.

HIST 496, 696 Studies in Legal History 3(3,0) Study of selected problems in the development of law and the system of criminal and civil justice.

HIST H497 Senior Honors Research 3(3,0) Research for the preparation of senior honors thesis. *Preq:* Senior standing, successful completion of a 400-level history course, approval of the Department of History.

HIST H498 Senior Honors Thesis 3(3,0) Writing of the senior honors thesis. *Preq:* HIST H497.

HIST 499 Independent Study 1-3(1-3,0) Study of selected problems in history under the direction of a faculty member chosen by the student. Student and faculty member develop a course of study designed for the individual student and approved by the department chair prior to registration.

HORTICULTURE

Professors: D. W. Bradshaw, R. G. Halfacre, M. T. Haque, B. B. Rhodes, T. Whitwell, *Chair*; *Associate Professors:* W. V. Baird, J. D. Caldwell, A. J. Pertuit, Jr.; *Assistant Professor:* J. E. Faust

HORT 101 Horticulture 3(3,0)F Environmental factors and horticultural practices affecting optimum production of floral, fruit, ornamental, and vegetable crops. Survey of the various areas of horticulture and their importance to society.

HORT 202 Selected Topics 1-3(1-3,0) Introduction to developing trends/concepts/technologies in horticulture. May be repeated for a maximum of three credits or a maximum of three credits in combination with HORT 400, but only if different topics are covered. *Preq:* Consent of instructor.

HORT 208 Landscape Appreciation 3(3,0)S Deepens students' appreciation of natural and built environments through a study of landscape elements, styles, and professions. Landscapes ranging in scale from residential to regional are critiqued, and design principles and landscape ethics are discussed.

HORT 212 Introduction to Turfgrass Culture 3(3,0) Studies of the introductory principles associated with the art and science of turfgrass culture. Develops an understanding of the history and evolution of turfgrasses and turfgrass culture. Explores career potentials in turfgrass management. Explains the basic scientific principles and techniques associated with the propagation and establishment of fine turfgrasses. *Preq:* BIOSC 205, 206.

HORT 271 Internship 1-6(0,2-12) Preplanned, practical, supervised work experience to give beginning students on-the-job learning opportunities that support classroom experience. Students submit monthly reports and present a departmental internship seminar. Undergraduates may accumulate a maximum of six credits for participation in HORT 271 and/or 471. *Preq:* Consent of instructor.

HORT 303 Plant Materials 3(2,3)F Woody, ornamental plants and their aesthetic and functional uses in landscape developments. Study covers habit of growth, ultimate size, texture effect, period of bloom, color, and cultural requirements.

HORT 304 Annuals and Perennials 3(2,3)S Annual and perennial flowers' aesthetic appeal and functional uses and needs. Color, texture, bloom time, form, size, and growth requirements as they relate to designing, planting, and maintaining colorful landscapes. *Preq:* HORT 208, 303, or consent of instructor.

HORT 305 Plant Propagation 3(2,3)F,S All phases of plant propagation from seeds, bulbs, divisions, layers, cuttings, budding, and other types of grafting are comprehensively treated. Timing, manner, and material for making cuttings; temperature and media requirements and propagation structures for rooting cuttings of ornamental and fruit trees, shrubs, and indoor plants are studied.

HORT 306 Plant Propagation Techniques Laboratory 1(0,3) Techniques of plant propagation including sexual methods: germination, scarification, and stratification. Asexual methods including grafting, budding, cuttings, layering, tissue culture divisions, and separations. Local nurseries are visited. *Coreq:* HORT 305.

HORT 308 Landscape Design 4(3,3)F Landscape planning of residential and public properties in order to achieve best use and most enjoyment from a given piece of ground. *Preq:* HORT 208, 303, or consent of instructor.

HORT 310 Greenhouse Crop Physiology 3(2,3)S Physiology, growth, and development of floriculture crops in fully or semi-controlled environments, including manipulation of flowering, chemical and environmental height regulation, fertility in artificial substrates, scheduling, cost analysis, and pest management. *Preq:* CSENV 202, HORT 101, or consent of instructor.

HORT 316 Floral Design 3(2,3)F Topics include simple arrangements (history, containers, mechanical aids, etc.), arrangements for specific occasions, church arrangements, funeral designs, bride's bouquets, dried arrangements and flower preservation, corsage work, foliage arrangements, bonsai, terrarium, Christmas wreaths, and foliage plant identification.

HORT 352, 652 Tree Fruit Culture and Physiology 3(2,3)F Fruit bud formation, rest period, and water relations of fruit plants, soils, fruit setting; orchard soil management and responses of various fruits to fertilizers; principles of pruning, effect of climatic differences, freezing of tissues, and means of avoiding injury; harvesting, transportation, and storage. *Preq:* HORT 101 or consent of instructor.

HORT 400 Selected Topics 1-3(1-3,0) In-depth examination of developing trends/concepts/technologies in horticulture. May be repeated for a maximum of three credits or a maximum of three credits in combination with HORT 202, but only if different topics are covered. *Preq:* Junior standing or consent of instructor.

HORT 406, 606 Nursery Technology 3(2,3)S Principles and techniques in handling nursery crops. *Preq:* HORT 303, 305.

HORT 408 Special Problems in Horticulture 1-3(0,3-9) Independent investigation in horticulture. Emphasis is on organizing a quality proposal, conducting the investigation, and reporting findings at a professional society meeting and/or in a professional publication. Cumulative maximum of three credits. *Preq:* Minimum of 75 hours completed and consent of instructor.

HORT 409 Seminar 1(1,0)S Recent research work on various phases of horticulture, methods of conducting investigations, and preparation of report of investigations.

HORT 412, 612 Turfgrass Management 3(2,3)F Study of warm and cool season turfgrasses in relation to value, use, regional adaptation, establishment, soils, and cultural practices. Influence of environmental, cultural, and genetic factors on turf quality and serviceability. Identification of grass and weed species and discussion of programs for the management of lawns, parks, roadsides, and golf courses. *Preq:* BIOL 103 or equivalent.

HORT (FOR) 427 Urban Tree Care 3(3,0) See FOR 427.

HORT (CSENV) 433, 633 Integrated Weed Management for Agronomic and Horticultural Crops 3(2,2)S Weed management systems consisting of cultural, chemical, and biological methods are studied for the major agronomic and horticultural crops of South Carolina with problem-solving methodology and herbicide injury diagnosis. *Preq:* CSENV 407 or equivalent introductory weed science.

HORT 455, 655 Small Fruit Crops 3(2,3)F In-depth survey of taxonomical, morphological, and physiological characteristics of small fruit crops as they relate to the study of horticultural characteristics, culture, production, harvesting, and handling of both commercial and home-grown grapes, blueberries, strawberries, brambles, and kiwifruit. *Preq:* HORT 101 or consent of instructor.

HORT 456, 656 Vegetable Crops 3(3,0)F Principles and practices employed in commercial growing and marketing of vegetable crops with emphasis on plant characteristics, cultivars, management practices, harvest, quality factors and grading, storage, economic importance, and areas of production.

HORT 461, H461, 661 Problems in Landscape Design 4(3,3)S Landscape planning for larger residential properties, schools, industrial plants, real estate developments; detailed finished plans; further study of materials used; original problems; field study. *Preq:* HORT 308, 407, or consent of instructor.

HORT (BIOSC) 465, 665 Plant Molecular Biology 3(3,0) See BIOSC 465.

HORT 471, 671 Advanced Internship 1-6(0,2-12) Preplanned work experience under competent supervision in approved agency dealing with horticultural endeavors. Gives advanced students on-the-job learning opportunities to apply acquired knowledge and skills. Monthly reports and final departmental seminar required. Undergraduates may accumulate a maximum of six credits for participation in HORT 271 and/or 471. *Preq:* Junior standing and consent of instructor.

HORT 472, 672 Garden Experiences in Youth Development 2(1,3) Exploration of the role of gardening and related outdoor experiences in enhancement of educational development, self-esteem and pro-social behavior in elementary school children. *Preq:* Senior standing and consent of instructor.

HOSPITAL AND HEALTH SERVICES ADMINISTRATION

H ADM 408, 608 Hospital and Health Services Administration 3(3,0) Survey of hospital and health-care administration practices in the U.S. Topics include planning; social, legal, and political considerations; alternate forms of organization; management practices; control systems; and trends/issues facing the future of health-care administrators. *Preq:* Senior standing or consent of instructor.

H ADM 410, 610 Hospital Internship 3(0,9) Students spend nine hours per week on a specified program of observing, practicing, and experiencing the duties of hospital administrators in selected local hospitals. Course is specifically outlined along with the amount of time students spend in each phase or department of the hospital. Student progress is constantly monitored by University faculty and hospital staff. *Preq:* H ADM 408.

HUMANITIES

Professor: S. K. Eisiminger; *Associate Professor:* A. Bennett

HUM 301 Humanities 3(3,0) Introduction to humanistic studies focusing on relationships among disciplines—painting, sculpture, architecture, music, literature, philosophy, and drama—beginning with prehistory and continuing to the Renaissance.

HUM 302 Humanities 3(3,0) Introduction to humanistic studies focusing on relationships among disciplines—painting, sculpture, architecture, music, literature, philosophy, and drama—beginning with the 17th century and continuing to the present.

HUM 306 Creative Genius in Western Culture 3(3,0) Investigation of creativity through study of great innovators in art, literature, music, and ideas. May be repeated once for credit.

HUM 309 Studies in Humanities 3(3,0) Interdisciplinary approach to the humanities. Special subject matter varies according to the instructor and as approved by the chair of the English Department. May be repeated once for credit.

HUM (ENGL) 456 Literature and Arts of the Holocaust 3(3,0) See ENGL 456.

INDUSTRIAL ENGINEERING

Professors: R. P. Davis, W. J. Kennedy, D. L. Kimbler, M. S. Leonard, *Interim Chair*; *Associate Professors:* B. R. Cho, W. G. Ferrell, Jr., A. K. Gramopadhye, J. S. Greenstein, B. J. Melloy

I E 201 System Design I 4(3,3) Introduction to the design of industrial engineering systems. Design methodologies are introduced in the context of a design process that includes identifying user needs; developing a design specification; generating, evaluating, refining, and selecting design concepts; detail design; constructing, testing, and refining prototypes; and delivering the product to the customer. *Preq:* ENGR 120.

I E 210 Design and Analysis of Work Systems 4(3,3) Facilities planning and design, workplace design, ergonomics of workplace design, performance measurement, and methods engineering. *Coreq:* MTHSC 302.

I E H300 Junior Honors Seminar 0 Aquaints students enrolled in the Departmental Honors Program with current research issues in the profession. This assists students in preparing a research proposal for the senior thesis. *Preq:* Junior standing, admission to Departmental Honors Program.

I E 320 Design of Information Systems in Industrial Engineering 3(2,3) [C.2] Introduction to object-oriented programming principles and their use in human-centered system design. *Preq:* ENGR 120.

I E 340, H340 Systems and Flows 3(2,3) Systems concepts; modeling, design, and analysis of network flows involving material and information in production and service systems. *Preq:* MTHSC 208, M E 310.

I E 361 Industrial Quality Control 3(3,0) Quality engineering techniques focusing on process control using statistical methods including control charts and acceptance sampling. *Preq:* MTHSC 302.

I E 368 Professional Practice in Industrial Engineering 1(1,0) Seminar to orient students to issues of professional development and professional practice of industrial engineering. *Preq:* I E 201.

I E 374 Advanced Manufacturing Systems 3(3,0) Study of state-of-the-art automated manufacturing systems, CAD/CAM, computer-integrated manufacturing, advanced 3-D computer controlled machining systems, adaptive control, group technology, and flexible manufacturing systems. *Preq:* I E 210.

I E 380 Methods of Operational Research I 3(3,0) Introduction to operations research models, including linear programming, integer linear programming, transportation and assignment problems, and network flows. *Preq:* MTHSC 206.

I E 381 Methods of Operational Research II 3(3,0) Probabilistic modeling of engineering systems. Topics include calculus-based probability, decision analysis, Markov processes, queueing, and reliability. *Preq:* MTHSC 208, 302. *Coreq:* I E 384.

I E 384, H384 Engineering Economic Analysis 3(3,0) Basic principles and techniques of economic analysis of engineering projects. Consideration of time, value of money, short- and long-term investments, replacement analysis, depreciation methods, cost allocation, and measures of cost effectiveness. *Preq:* MTHSC 108.

I E 452, 652 Reliability Engineering 3(3,0) Probabilistic approach to assessing system reliability. Methods for analyzing serial, parallel, and complex systems. Reliability life testing and its acceleration are covered. Essential elements of maintainability are identified and related to system availability. *Preq:* MTHSC 206 and 302 or consent of instructor.

I E 460, H460, 660 Quality Improvement Methods 3(3,0) Study of modern quality improvement techniques presented in an integrated, comprehensive context. *Preq:* Senior standing.

I E 461, 661 Quality Engineering 3(3,0) Design aspects of quality and the engineer's role in problems of quality in production systems. *Preq:* I E 361.

I E 465, H465, 665 Facilities Planning and Design 3(3,0) Study of the principles and techniques of plant layout. Economic selection of materials handling equipment and integration of this equipment into the layout plan to provide effective product flow. Quantitative techniques for evaluation of facilities plans. A design project is required. *Preq:* I E 210 and 380 or consent of instructor.

I E 467 Systems Design II 3(2,3) Provides students with the challenge of integrating and synthesizing general engineering knowledge into creatively solving real-world, open-ended problems. This includes developing the problem statement, objectives, and criteria; data collection; technical analysis; developing and integrating recommendations; and presenting results. *Preq:* I E 201, 210, 320, 340, 361, 380, 381, 384.

I E 482, 682 Systems Modeling 3(3,0) Modeling of discrete industrial systems using a digital computer. The purpose, theory, and techniques of system modeling are presented. *Preq:* I E 381 and MTHSC 302 or consent of instructor.

I E (B E, EE&S) 484, 684 Municipal Solid Waste Management 3(3,0) See EE&S 484.

I E 485, 685 Industrial Systems Engineering 3(3,0) Modeling and analysis of multistage decision processes, recursive optimization, process and system design, and control problems. *Preq:* I E 380 and 381 or consent of instructor.

I E 486, H486, 686 Production Planning and Control 3(3,0) Fundamentals of forecasting demand, scheduling production, and controlling the movement and storage of material asociated with production are studied. State-of-the-art manufacturing techniques are discussed. A design project is required. *Preq:* I E 380, 384.

I E 487, 687 Industrial Safety 3(3,0) Recognition and prevention of hazards; recognition and control of hazardous materials; developing and managing a safety program; designing inherently safe equipment and workplaces. *Preq:* Junior standing.

I E 488, 688 Human Factors Engineering 3(3,0) Introduction to design for human use. Information about human performance, abilities, and limitations is surveyed and applied to the design of tools, machines, facilities, tasks, and environments for efficient, safe, and comfortable human use. *Preq:* I E 210 or consent of instructor.

I E 489, 689 Industrial Ergonomics and Automation 3(2,3) Physical ergonomics and ergonomics in industrial settings, including work physiology, the physical environment, automated systems, and hybrid work systems. *Preq:* I E 210 or consent of instructor.

I E 491, H491, 691 Selected Topics in Industrial Engineering 1-3(0-3,0-9) Comprehensive study of any timely or special topic in industrial engineering not included in other courses. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

I E 492, H492, 692 Design Topics in Industrial Engineering 1-3 Comprehensive study of any timely or special design topic in industrial engineering. May be repeated for a total of six credits. *Preq:* Consent of instructor.

INTEGRATED PEST MANAGEMENT

Professor: J. A. Brittain

I P M 401, 601 Principles of Integrated Pest Management 3(3,0) Origins, theory, and practice of integrated pest management. Relationships among crop production and protection practices are explored. Economics of various control strategies are considered. Integrated pest management field projects are studied. Conventional and integrated pest management approaches are compared. Multidisciplinary plant problem analysis is introduced. *Preq:* CSENV 407, ENT 301, PL PA 401, or consent of instructor.

ITALIAN

Associate Professor: B. M. Zaczek; *Lecturer:* J. Bridgwood

ITAL 101 Elementary Italian 4(3,1) Introductory course stressing grammar, pronunciation, oral practice, and reading skills. Attention is given to practical everyday living as well as cultural considerations.

ITAL 102 Elementary Italian 4(3,1) Continuation of ITAL 101. *Preq:* ITAL 101 or consent of instructor.

ITAL 201, H201 Intermediate Italian 3(3,0) Intermediate course to build on the foundation of previous language courses, with practice in listening, speaking, reading, and writing. Introduction to cultural perspectives through readings of literary prose selections. *Preq:* ITAL 102.

ITAL 202, H202 Intermediate Italian 3(3,0) Increasingly difficult readings in Italian literature, supplemented with classroom discussions and compositions. *Preq:* ITAL 201.

ITAL 301 Introduction to Italian Literature 3(3,0) Study of selected texts of Italian literature in their artistic, cultural, and social context. May include theme and genre studies. *Preq:* ITAL 202 or consent of department chair.

ITAL 302 Modern Italian Literature 3(3,0) Study of selected works from major 19th and 20th century Italian authors, including Manzoni, Verga, Svevo, Moravia, Ginzburg. *Preq:* ITAL 202 or consent of department chair.

ITAL 305 Intermediate Italian Conversation and Composition 3(3,0) Practice in the written and spoken language with emphasis on vocabulary, pronunciation, and comprehension. *Preq:* ITAL 202 or consent of department chair.

ITAL 307 Italian Civilization and Culture 3(3,0) Study of the significant aspects of Italian civilization and culture through analysis of literary texts, paintings, films, and magazine articles. *Preq:* ITAL 202 or consent of department chair.

ITAL 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in Italian literature, language, and culture. May be repeated for a total of six credits. *Preq:* Consent of department chair.

ITAL 400 Image of an Italian City 3(3,0) Study of historical, social, and architectural images of Italian cities through analysis of literary texts and films. *Preq:* ITAL 202 or consent of instructor.

JAPANESE

Associate Professor: T. Kishimoto; *Assistant Professor:* E. L. Williams; *Lecturer:* M. Ejiri

JAPN 101 Elementary Japanese 4(3,1) Course for beginners. Fundamentals are taught, and a foundation is provided for further study and the eventual ability to read and speak the language. The Japanese writing system is introduced. Students learn how to recognize and write the two alphabets Hiragana and Katakana. Three hours a week of classroom instruction and one hour a week in the language laboratory.

JAPN 102 Elementary Japanese 4(3,1) Continuation of JAPN 101. Students study Kanji characters. *Preq:* JAPN 101.

JAPN 201 Intermediate Japanese 3(3,0) Brief review of JAPN 101 and 102, with conversation, composition, and beginning of more serious reading of Japanese in short stories. Students study Kanji characters. *Preq:* JAPN 102.

JAPN 202 Intermediate Japanese 3(3,0) Brief review of JAPN 201, with conversation, composition, and dictation based on more difficult Japanese reading selections; includes a continuation of Kanji characters. *Preq:* JAPN 201.

JAPN 305 Japanese Conversation and Composition 3(3,0) Practice in the spoken language with emphasis on vocabulary, Kanji, pronunciation, and comprehension; learning practical language skills and intercultural communication through various topics. *Preq:* JAPN 202 or consent of department chair.

JAPN 306 Japanese Conversation and Composition 3(3,0) Continuation of JAPN 305. More practice in the spoken language with emphasis on vocabulary, Kanji, pronunciation, and comprehension. Learning practical language skills and intercultural communication through various topics. *Preq:* JAPN 305 or consent of department chair.

JAPN 307 Japanese Civilization I 3(3,0) Study of the significant aspects of the culture of Japan. *Preq:* JAPN 202 or consent of department chair.

JAPN 308 Japanese Civilization II (3,3,0) Study of significant aspects of the culture of Japan. *Preq:* JAPN 202 or consent of department chair.

JAPN 316 Japanese for International Trade I 3(3,0) Spoken and written Japanese common to the Japanese-speaking world of business and industry, with emphasis on business practices and writing and translating business letters and professional reports. Cross-cultural references provide opportunity for comparative and contrastive analysis of American and Japanese cultural patterns in a business setting. *Preq:* JAPN 306 or consent of department chair.

JAPN 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in Japanese literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

JAPN 401 Japanese Literature in Translation 3(3,0) Introduction to Japanese literature from 712 A.D. to the present. Cultivates an appreciation for Japanese literature and culture. All readings and discussions are in English. May not be used to satisfy general foreign language requirements.

JAPN 406 Introduction to Japanese Literature 3(3,0) Students read contemporary Japanese narrative fiction, poetry, and drama in their historical and social context. *Preq:* 300-level Japanese course or consent of department chair.

JAPN 411 Studies in the Japanese Language I 3(3,0) Advanced training in the spoken and written language with emphasis on formal expressions. *Preq:* JAPN 306 or consent of department chair.

JAPN 412 Studies in the Japanese Language II 3(3,0) In-depth study of Kanji characters. *Preq:* JAPN 411 or consent of department chair.

JAPN 416 Japanese for International Trade II 3(3,0) Study of language and cultural environment of the Japanese-speaking market, including the linguistic and cultural idioms which support global marketing in general and the international marketing of textiles, agricultural products, and tourism in particular. *Preq:* JAPN 316 or consent of department chair.

JAPN (ANTH) 417 Japanese Culture and Society 3(3,0) Focuses on basic themes in Japanese culture found in social interaction and ritual behavior. Japanese social organization, including marriage and family patterns, neighborhood and community organization, and gender roles receive extensive attention. All readings and discussions in English. May not be used to satisfy general foreign language requirements.

JAPN 491 Senior Seminar in Japanese Literature 3(3,0) Close readings of various works of premodern and modern Japanese literature; study of important authors and their representative works in prose and poetry. Familiarizes students with the cultural and linguistic nuances of literature in the original language. All readings and activities in Japanese. *Preq:* JAPN 306.

JAPN 499 Selected Topics in Japanese Culture 3(3,0) Topic-generated examination of fundamental cultural themes in premodern and modern Japan, including, but not limited to, such topics as Japanese drama, poetry, prose, religious traditions, cinema, and folklore/mythology. May be repeated for a maximum of six credits, but only if different topics are covered. Readings and discussions in English. May not be used to satisfy general foreign language requirements.

LANDSCAPE ARCHITECTURE

Professors: D. L. Collins, *Chair;* J. C. Schach, L. Tai; *Associate Professors:* F. F. Chamberlain, U. Yilmaz; *Assistant Professor:* S. G. Harrison; *Adjunct Professor:* G. Vander Mey; *Lecturers:* C. L. K. Martin, B. R. Witherspoon

LARCH 151 Basic Design I 3(0,6) Studio introduction to design fundamentals through 2D and 3D application of basic systems and development of attitudes essential to the creative design process. *Preq:* Open to Landscape Architecture majors only. *Coreq:* LARCH 153.

LARCH 152 Basic Design II 3(0,6) Further investigations into design fundamentals through 2D and 3D application of basic systems and development of attitudes essential to the creative design process. *Preq:* LARCH 151. *Coreq:* LARCH 154.

LARCH 153 Landscape Architecture Design Theory I 1(1,0) Lecture course on the underlying theories of design and visual perception that constitute the language of design. Topics include conceptual thinking and problem solving, visual communication, and interaction between design elements and principles. *Preq:* Landscape Architecture major. *Coreq:* LARCH 151.

LARCH 154 Landscape Architecture Design Theory II 1(1,0) Second in a series of lecture courses on the underlying theories of design and visual perception that constitute the language of design and landscape architecture. Topics include light and value perception, color theories, basic perspective systems. *Preq:* LARCH 151, 153. *Coreq:* LARCH 152.

LARCH 251 Basic Design III 6(1,10) Studio focused on design concepts, planning, and project development at the abstract level. Lectures, demonstrations, and exercises support basic landscape architectural design and theory. *Preq:* LARCH 152.

LARCH 252 Basic Design IV 6(1,10) Studio devoted to the methodology of the process. Transition from the abstract to more landscape-specific applications. Lectures, demonstrations, and excercises support basic landscape architectural design and theory. *Preq:* LARCH 251.

LARCH 262 Landscape Architectural Technology I 3(2,2) Introduction to landscape architecture technologies, methods and construction documents including site information gathering and analysis, elementary problems in site grading and drainage, methods for estimating cut and fill, and principles of stormwater management. Explorations in hand and computer graphic techniques used in construction drawings. *Preq:* B E 221, sophomore standing in design studios.

LARCH 293 Field Studies Internship 1-3(0,3-9) Skill-based practical work experience to give beginning students on-the-job learning opportunities. Requires a minimum of five weeks of uninterrupted, supervised, practical experience with preapproved commercial firm or public agency dealing with landscape architectural site issues. May be repeated for a maximum of six credits. To be taken Pass/Fail only. *Preq:* DSIGN 252, consent of instructor.

LARCH 351 Landscape Architecture Design Studio I 6(1,10) Studio work with adjunct lectures focused on site-specific design solutions for two or three projects of modest scale. Projects typically involve one property and one use, with an emphasis on published case studies, site analysis, synthesis, and concept development. Introductory experiences in verbal and graphic presentation techniques. *Preq:* LARCH 252.

LARCH 352 Landscape Architecture Design II 6(1,10) Studio work and adjunct lectures featuring problems of greater use complexity than those found in LARCH 351. Projects begin with program and planning issues and proceed to a design resolution. Additional skill building in graphic and oral presentations. *Preq:* LARCH 351.

LARCH 362 Landscape Architectural Technology II 3(2,3) Intermediate course in landscape architecture construction documents and methods including horizontal and vertical alignment of roadways, complex site grading, and storm water management problems. *Preq:* LARCH 262, Junior standing in design studios.

LARCH 421 Landscape Architectural Seminar 3(3,0) Lectures and seminars dealing with pertinent topics related to environmental, technological, and theoretical issues in landscape architecture, land planning, and urban design. May be repeated for a maximum of six credits. *Preq:* Senior standing or consent of instructor.

LARCH 428 Landscape Architecture Computer-Aided Design 3(2,2) Lecture and lab class which focuses on computer-aided design and drafting using PowerCADD or MiniCAD-Vector programs in alternating years. Students learn how to create landscape architecture illustrative drawings, construction drawings and/or portfolio work in black and white and color. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

LARCH 451 Landscape Architecture Design III 6(1,10) Studio work of substantial scale or complexity such as multiple building complexes, neighborhoods, campus masterplans, research or business parks, or residential communities. Projects may be undertaken on a simultaneous basis to simulate professional practice. Projects may include the integration of computer technologies. Site construction technology issues may be introduced. *Preq:* LARCH 352.

LARCH 452 Landscape Architecture Design IV 6(1,10) Studio focused on projects of substantial scale or complexity. Topics may include public service projects which vary in nature (urban design, town planning, codes and regulations). Emphasis is on professional responsibilities in community service, on-site case study analysis, graphic and verbal communication. *Preq:* LARCH 451.

LARCH 462 Landscape Architectural Technology III 3(2,2) Advanced overview of construction materials and methods used in project implementation. Study characteristics, strengths, nominal sizes and uses of materials (asphalt, brick, concrete, stone, wood). Field trips, exercises, and preparation of construction documents develop understanding of how design ideas are realized in built form. *Preq:* LARCH 362.

LARCH 490 Directed Studies and Projects in Landscape Architecture 1-5(0,3-15) Comprehensive studies and/or research of special topics not covered in other landscape architecture courses. May be repeated for a maximum of ten credits. *Preq:* Consent of instructor.

LARCH H491 Honors Research Methods for Landscape Architecture 1-3(1-3,0) Students investigate various research methodologies in landscape architectural design or related areas and apply to student generated project(s). Students generate a proposal for Landscape Architecture Honors Research. *Preq:* Junior standing; membership in Calhoun Honors College Program, consent of Department Honors Program Advisor.

LARCH 493 Professional Office Internship 1-3(0,3-9) Office experience for advanced students. On-the-job learning requires a minimum of five uninterrupted sequential weeks of employment under the direct supervision of a preapproved registered landscape architect, architect, urban planner, or civil engineer. May be repeated for a maximum of six credits. To be taken Pass/Fail only. *Preq:* LARCH 352, 362, consent of instructor.

LARCH H494 Landscape Architecture Honors Research 2-3(2-3,0) Independent, student-generated research on preapproved topic conducted under the supervision and weekly guidance of a faculty member; second in a sequence of three required courses for students enrolled in Departmental Honors Program. Written interim report and presentation to faculty and honors students required before the end of the semester. *Preq:* LARCH H491; membership in Calhoun Honors College Program.

LARCH H495 Landscape Architecture Honors Thesis 2-3(2-3,0) Continuation of independent research, conducted under the supervision and weekly guidance of a faculty member; third in a sequence of three required courses for students enrolled in Departmental Honors Program. Written thesis is submitted and presented before the end of the semester to qualify for Departmental Honors. *Preq:* LARCH H494.

LARCH 551 Landscape Architecture Design V 3(1,10) Studio work and adjunct lectures featuring complex problem-solving projects involving regional design analysis and planning, city planning and urban design, complex building relationships and intense site utilization in an urban setting. Studio may be taken in Charleston, Genoa, or Barcelona. *Preq:* LARCH 452.

LARCH 552 Landscape Architecture Design VI 6(0,14) Studio work on student-selected professional level exit project including design-build project or substantive research project. Exit studio synthesizes and builds on skills developed throughout the Landscape Architecture program. Also provides opportunities for students to inquire into areas of interest not otherwise covered. *Preq:* LARCH 452.

LARCH 562 Landscape Architectural Technology IV 2(0,4) Studio course for the integration of design and technology. *Preq:* LARCH 462, professional standing. *Coreq:* LARCH 552.

LARCH 581 Landscape Architectural Professional Practice 3(3,0) Lecture course dealing with general consideration of landscape architectural office procedures. Study of the professional relationships of the landscape architects to client and contractor including problems of ethics, law, and business. *Preq:* Professional standing or consent of instructor.

LANGUAGE

LANG 191 Working/Internships Abroad Survey 1(1,0) Survey to familiarize students going abroad for work/internships with various international work environments. To be taken Pass/Fail only. *Preq:* Consent of instructor.

LANG (SPCH) 400, 600 Phonetics 3(3,0) Study of basic phonetic concepts used in the study of sounds in language.

LANG 401 China Study Abroad 3(3,0) Six-week intensive summer course on Chinese culture offered in China. Main topics include origin and history of Chinese language, Chinese nationalities, geography, architecture, arts, and social custom. All readings and discussions are in English. May be repeated for a maximum of six credits.

LANG (ENGL) 454 Selected Topics in International Film 3(2,3) Presents subtitled films of specific world cultures and basic film theory and discourse applicable to the selected areas. Taught in English. May be repeated for a maximum of six credits with consent of department chair. *Preq:* Sophomore standing or consent of department chair.

LANG 455 Hispanic Film: Documentary and Feature 3(3,0) Overview of theory and discourse on Hispanic film. Through lectures, discussions, and films, students become acquainted with film as a vehicle for understanding the Hispanic World. Taught in English. Films are in Spanish with English subtitles. *Preq:* Sophomore standing or consent of department chair.

LANGUAGE AND INTERNATIONAL TRADE

Professors: J. C. Bednar, *Director;* P. R. Heusinkveld, K. Szmurlo; *Associate Professor:* T. Kishimoto; *Assistant Professors:* C. L. Chávez, C. Coria-Sánchez, N. Corrales

L&IT 127 Introduction to Language and International Trade 1(1,0) Survey of the nature of international trade and related career opportunities. Information and applications of specific relevance to tourism, agriculture, and textile industries are offered. To be taken Pass/Fail only.

L&IT 400 Language and International Trade Internship 1-3 One-semester, full-time (or equivalent part-time) work assignment which provides the opportunity for students to extend theoretical classroom learning through work experience in an appropriate setting. A final report is required. May be repeated for a total of six credits. To be taken Pass/Fail only. *Preq:* FR 316, GER 316, or SPAN 316; 12 semester hours in a Language and International Trade technical option.

L&IT 401 Language and International Trade Practicum 1-3 Foreign language experience such as an approved study abroad program which provides the student with the opportunity to apply theoretical classroom learning to a foreign language experience in an appropriate setting. To be taken Pass/Fail only. *Preq:* FR 316, GER 316, or SPAN 316, six credits in language.

L&IT 402 Language and International Trade Directed Study 3 Directed study of an individual project in language and international trade. To be taken Pass/Fail only.

LATIN

Lecturer: B. B. Lawson

LATIN 101 Elementary Latin 4(4,0) Course for beginners designed principally to teach the reading of the language.

LATIN 102 Elementary Latin 4(4,0) Continuation of LATIN 101.

LATIN 201 Intermediate Latin 3(3,0) Review of the fundamental principles of grammar in conjunction with readings from the Classical period. *Preq:* LATIN 102 or equivalent.

LATIN 202 Intermediate Latin 3(3,0) Continuation of LATIN 201 with the introduction of writings from the late Latin and Medieval periods. *Preq:* LATIN 201 or equivalent.

LEGAL STUDIES

Associate Professor: F. L. Edwards; *Assistant Professors:* M. E. Mowrey, V. L. S. Ward-Vaughn; *Lecturers:* W. H. Durham, J. R. Jahn

LAW 312 Commercial Law 3(3,0) Introduction to business law with primary attention given to contracts, agency, and negotiable instruments. *Preq:* Junior standing.

LAW 313 Commercial Law 3(3,0) Continuation of LAW 312 with emphasis on business organizations, personal and real property, estates and bankruptcy, sales and secured transactions. *Preq:* LAW 312 or consent of instructor.

LAW 322, H322 Legal Environment of Business 3(3,0) Examination of both state and national regulation of business. Attention is given to the constitution and limitations of power, specific areas in which governments have acted, and the regulations that have been imposed in these areas. *Preq:* Junior standing.

LAW 333 Real Estate Law 3(3,0) The nature of real property and means of acquiring rights therein: conveyance of ownership, creation and execution of deeds, mortgages, etc., landlord and tenant relationships, shared concepts, and government regulation.

LAW 399 Internship in Legal Studies 1-3 Faculty-supervised legal internship to give students on-the-job learning opportunities that support classroom experiences. Credit will not be given for internships of less than six full-time, consecutive weeks with the same internship provider. May be repeated for a maximum of three credits. To be taken Pass/Fail only. *Preq:* Junior standing or consent of instructor.

LAW 401 Labor Law 3(3,0) Basic labor law in the National Labor Relations Act, the Taft-Hartley and Landrum-Griffin Acts; legal problems raised by state and federal statutes such as Workmen's Compensation, Wage and Hour Legislation, and Equal Opportunity laws. *Preq:* LAW 322, Junior standing.

LAW 405, 605 Construction Law 3(3,0) Provides a practical knowledge of legal principles applied to the construction process and legal problems likely to be encountered by practicing construction professionals. Topics include construction contracting, liability, claims and warranties, documentation, and responsibility and authority of contracting parties. *Preq:* LAW 312 or 322 or consent of instructor.

LAW 420 International Business Law 3(3,0) Intensive examination of the historical background of modern public and private international law; selected issues of public international law—human rights, law of war, United Nation's system, and international litigation; selected issues of private international law—international sales, international trade, and formation and operation of multinational businesses. *Preq:* LAW 312 or 322 or consent of instructor.

LAW 429, 629 Environmental Law and Policy 3(3,0) Review of legal issues involving environmental law and policy. Covers the law regarding water, land, and air pollution, and other special laws such as Superfund and RCRA. The consequences of existing and alternative rules for environmental protection are subject to economic analysis. *Preq:* LAW 312 or 322 or consent of instructor.

LAW 499, 699 Selected Topics 1-3(1-3,0) In-depth examination of timely topics in legal studies. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Senior standing and consent of instructor.

LEISURE SKILLS

Professor: J. R. Pope, Jr.; *Assistant Professor:* M. H. Wynn; *Lecturer:* B. W. Stevens

L S 101 Challenge Recreation Activities 1(1,0) Encourages students to broaden their leisure skills and improve self-image through challenge activities. Classroom instruction stresses how to get started safely in flying, scuba, canoeing, skiing, windsurfing, mountaineering, hang-gliding, ballooning, and other challenge activities.

L S 110 Bowling 1(0,3) Basic instructional program on techniques of bowling.

L S 120 Selected Topics 1(0,3) Presentation of leisure skills not covered in other courses. May be repeated for a maximum of three credits, but only if different topics are covered.

L S 130 Alpine Skiing 1(0,3) Basic downhill snow skiing instruction including equipment selection, safety, and maintenance; parallel turns; edging; carved and linked turns; wedeling; and safety and etiquette. There is an additional fee for this course. Taught during Christmas recess. (Contact the Department of Parks, Recreation, and Tourism Management in October.)

L S 152 Sailing 1(0,3) Basic instruction in the nomenclature, safety and rescue techniques, and skills required to skipper sailing craft. *Preq:* Basic swimming skills.

L S 153 Beginning Canoeing 1(0,3) Basic instruction in the nomenclature, strokes, and safety techniques in canoeing. *Preq:* Basic swimming skills.

L S 154 Windsurfing 1(0,3) Basic windsurfing instruction including rigging, launching, tacking, jibbing, rig and foot steering, safety, maintenance, equipment selection, rules-of-the-road, and racing techniques are covered. Offered Fall Break and first summer session. There is an extra fee for this course. *Preq:* Ability to swim 300 yards and tread water for five minutes.

L S 155 Whitewater Kayaking 1(0,3) Flat-water and whitewater skills, techniques, safety, rescue, equipment selection and maintenance, and selection of routes/trips to participate in basic whitewater kayaking. *Preq:* Basic swimming skills.

L S 160 Beginning Tennis 1(0,3) Fundamental course stressing rules, strokes, and strategy, with ample opportunity for practice.

L S 163 Racquetball 1(0,3) Basic skills, knowledge of rules, strategy, and basic strokes.

L S 170 Beginning Golf 1(0,3) Fundamental course stressing rules, strategy, and basic strokes.

L S 181 Rock Climbing 1(0,3) Basic rock climbing skills, including philosophy, safety, knots, climbing techniques, site and supplies selection, and nature/conservation issues.

L S 182 Camping and Backpacking 1(0,3) Basic camping and backpacking skills including map and compass reading, outdoor cooking, camping hazards and safety, site selections, and trip planning.

L S 190 Modern Dance 1(0,3) Introduction to modern dance techniques with emphasis on developing the style of movement and understanding the dance art form.

L S 191 Aerobic Dance 1(0,3) Instruction in the development of skills for the safe improvement and maintenance of cardiovascular fitness, flexibility, and muscle tone utilizing dance movements and techniques.

L S 192 Learn to Dance 1(0,2) Students develop an understanding of the qualities of dance, recognize the importance of dance as a leisure pursuit, and learn to dance to difference types of music. Dances include shag, waltz, cha-cha, foxtrot, as well as current dance trends.

L S 201 Sports Officiating 1(0,3) Practical study of officiating for various sports. Includes studies and practical application of officiating rules and mechanics. Sports studied include football, basketball, softball, soccer, and introductions to a variety of other team sports.

L S 230 Advanced Alpine Skiing 1(0,3) Advanced downhill snow skiing instruction in such techniques as mogul skiing, check turns, free-style, and racing. There is an additional fee for course. Taught during Christmas recess. (Contact Department of Parks, Recreation, and Tourism Management in October.) *Preq:* L S 130 or consent of instructor.

L S 292 Intermediate Ballroom Dance 1(0,2) Students develop an understanding of advanced dance methods, learn about dance at social and competitive levels, and increase knowledge of a variety of both smooth and Latin steps at the intermediate level. Dances include tango, cha-cha, waltz, foxtrot and swing. *Preq:* L S 192 or permission of instructor.

L S 293 Intermediate Shag 1(0,2) Students develop an understanding of the South Carolina state dance, its history, and impact on the state. Students learn more advanced steps in shag, including bellyroll, sugarfoot, slide step, tiptoe up the ladder, pivot, and the thirteen steps. *Preq:* L S 192 or permission of instructor.

MANAGEMENT

Professors: J. K. Butler, Jr., R. S. Cantrell, M. D. Crino, J. S. Davis, D. W. Grigsby, J. J. Kanet, R. L. LaForge, T. L. Leap, *Chair;* M. A. McKnew, J. W. Patterson, P. L. Roth, V. Sridharan; *Associate Professors:* N. Balakrishnan, R. L. Clarke, L. D. Fredendall, J. Miller, T. L. Robbins, C. H. St. John, T. P. Summers; *Assistant Professors:* T. J. Douglas, M. J. Parzinger, R. L. Purvis, W. H. Stewart, Jr.; *Lecturers:* J. T. Churan, L. A. Hudson, Jr., T. B. Huneycutt, J. I. McKnew, G. L. Newkirk

MGT 218, H218 Management Personal Computer Applications 3(0,6) Personal computer applications that support managers. Students learn from hands on work rather than lecture. To be taken Pass/Fail only. *Preq:* CP SC 120 or consent of instructor.

MGT 301, H301 Principles of Management 3(3,0) Management's role as a factor of economic production. Functions of management, principles of organization, and behavior in organizations.

MGT 305 Economics of Transportation 3(3,0) Topics include history and structure of transportation systems in the United States, the nature of transportation costs and rates, transportation systems as factors in industrial location, transportation policy, and transportation's role in national security. *Preq:* Junior standing.

MGT (ECON) 306 Managerial Economics 3(3,0) See ECON 306.

MGT 307, H307 Personnel Management 3(3,0) Principles, concepts, and techniques concerned with effective and efficient utilization of personnel. Emphasis is on motivation, leadership, and human behavior related to employer-employee relations. Topics include personnel recruitment, classification, selection, training, development, and performance evaluation. *Preq:* Junior standing; one of the following: MTHSC 203, 301, 302, EX ST 301.

MGT (E L E) 315 New Venture Creation II 3(3,0) Second of a two part series examining entrepreneurship. Using opportunity analysis developed in MKT (E L E) 314, course focuses on designing and managing an organization capable of effectively pursuing the opportunity. Topics include organization strategy and design, start-up capital, operations and sourcing issues, leadership, team building, and management of rapid growth. *Preq:* MKT (E L E) 314.

MGT 317 Logistics Management 3(3,0) Management of physical distribution and supply systems with emphasis on design concepts, cost determinants, and control. *Preq:* Junior standing.

MGT 390 Operations Management 3(3,0) Examines the role of operations management in both manufacturing and service organizations. Discusses the concepts, tools, and techniques for managing the operations function. Topics include operations strategy, design, planning, and control. *Preq:* MTHSC 301 or equivalent.

MGT 400 Management of Organizational Behavior 3(3,0) Provides management students with a framework for understanding how behavior within business organizations is managed. Particular emphasis is on integrating management theory with recent developments in the behavioral sciences with distinct management applications. Theory, research, and business applications are considered. *Preq:* A grade of C or better in MGT 301.

MGT 402, H402 Operations Planning and Control 3(3,0) Managing, planning, and controlling production and service operations with emphasis on demand forecasting, aggregate planning, production scheduling, and inventory management. *Preq:* MA SC 310, 312, MGT 390.

MGT 403 Special Problems 1-3(1-3,0) Planning, developing, and executing a research project related to the field of management and defense studies. May be repeated for a maximum of six credits. *Preq:* Senior standing in Industrial Management or Management, consent of instructor.

MGT 404 Advanced Statistical Quality Control 3(3,0) Statistical quality control techniques as applied to all areas of quality control: process control, process capability, acceptance sampling, and economic aspects of quality decisions. *Preq:* MA SC 310, MGT 390.

MGT 408 Design of Production Systems 3(3,0) Examines the design of systems for production and delivery of goods and services. Emphasizes the impact of alternative designs on the competitive posture of the firm. Discusses the concepts, tools, and techniques for designing facilities and jobs and systems for continuous performance improvement. *Preq:* MA SC 310, 312, MGT 390.

MGT 411 Project Management 3(3,0) Examination and application of the project management body of knowledge. This consists of theory, tools, and techniques to organize, plan, and control individuals, teams, quality, and operations while conducting a project. *Preq:* EX ST 301 or MTHSC 301 or equivalent.

MGT 415, H415 Business Strategy 3(3,0) Capstone course for seniors. Various methods are used in analyzing complex business problems, requiring students to integrate their knowledge of all areas of business. Student participation and written and oral communications are stressed. *Preq:* Senior standing or consent of instructor.

MGT 416 Management of Human Resources 3(3,0) Recent developments in the management of human resources with emphasis on results of research into the motivation, development of potential, and full utilization of the human resources. *Preq:* A grade of C or better in MGT 307, 400; consent of instructor.

MGT 418 Management Information Systems 3(3,0) Use of data processing concepts as an aid in implementing managerial functions. Electronic data processing terminology, software, hardware, computer operations and techniques, systems analysis, and the principles of management information systems design and implementation are emphasized. *Preq:* MGT 218 or consent of instructor.

MGT 422 Small Business Management 3(3,0) Study of the management of the small independently owned and operated business. Emphasis is on analyzing new business opportunities, planning and establishing a growing concern, and managing the contemporary small business. Field experience in consulting with small businesses enhances students' understanding of the unique opportunities and problems of small business organizations. *Preq:* MKT 301 or consent of instructor.

MGT 423 International Business Management 3(3,0) Survey of theoretical and institutional complexities of international business operations. Topics include exporting, importing, foreign investment, multinational corporations, and international payment system. *Preq:* Junior standing.

MGT 424 International Transportation and Logistics 3(3,0) Examination and analysis of international transportation systems and their logistics support systems. Topics include ocean shipping, international air transportation, port management, and EEC and Soviet-block transport systems. International transport legislation and policies are also analyzed. *Preq:* Senior standing or consent of instructor.

MGT 425 Compensation Management 3(3,0) Examination of compensation employees seek in exchange for their efforts and contributions. Topics include government and union influences; job content analysis, description, and evaluation; developing pay structures; measuring and paying for performance; employee benefits; administration of the compensation plan; executive, managerial, professional, and sales. *Preq:* A grade of C or better in MGT 307, 400.

MGT 426 Industrial Traffic Management 3(3,0) Surveys the responsibilities and functions of industrial traffic management in manufacturing and distribution. Emphasis is on the role of the industrial traffic manager in optimizing the logistics system of the firm (i.e., the materials management of its inbound supplies and the distribution of its finished products). *Preq:* MGT 305 or 317.

MGT 427 Managing Continuous Improvement 3(3,0) Examination of issues related to continuous improvement, including a systematic approach to selecting improvement areas, determining how to improve, plan, and manage the improvement process. Topics include selecting performance measurements, using teams to achieve breakthrough change, identifying root causes of problems, and developing and implementing solutions to problems. *Preq:* MGT 390 or permission of instructor.

MGT 430 Senior Seminar in Management 3(3,0) In-depth study of current business topics; allows senior Management students the opportunity to relate their academic studies to real-world problems. A senior paper is required. *Preq:* Senior standing.

MGT 431 Employee Diversity, Rights, and Responsibilities 3(3,0) Focuses on employee and organizational rights and responsibilities. Topics include various types of discrimination (race, sex, religious, national origin, age, and disability status); drug and alcohol testing; AIDS in the workplace; employee discipline and termination issues; privacy and safety concerns; and union organizing campaigns. *Preq:* A grade of C or better in MGT 307, 400.

MGT 435 Personnel Interviewing 3(3,0) Helps students understand current interviewing theory, conduct an employment interview, and advise their future employers how to improve interviewing programs. Topics include job analysis, legal issues, types of interviews, and evaluating applicants. *Preq:* A grade of C or better in MGT 307, 400.

MGT 444 International Perspectives in Industrial Management 3-6(3-6,0) Provides an international perspective to industrial management via organized plant visitations to businesses in a foreign country and lectures by and discussions with senior operations manager(s). Cultural visits and lectures are also organized to provide a holistic perspective to cover cultural and economic environment of the host country. Students are responsible for travel costs. May be repeated for a maximum of six credits. *Preq:* Permission of instructor.

MGT 490 Selected Topics in Industrial Management 3(3,0) In-depth examination of advanced topics in Industrial Management. Topics may vary in keeping with developments in the management profession and interests of faculty. Emphasis is on the application of these topics to the production and operations management environment. *Preq:* MGT 402 or 404 or 408.

MANAGEMENT SCIENCE

Professors: R. S. Cantrell, M. A. McKnew, J. W. Patterson; *Assistant Professors:* N. Balakrishnan, J. L. Miller; *Lecturer:* J. I. McKnew

MA SC 310, H310 Intermediate Business Statistics 3(3,0) Quantitative methods of the management scientist with applications to business and industrial problems. Topics include regression analysis, correlation analysis, analysis of variance, sampling, and nonparametric methods. *Preq:* EX ST 301 or MTHSC 301.

MA SC 312, H312 Decision Models for Management 3(3,0) Exploration of ways in which management science decision models can help in making sound managerial decisions. Problem solving is Excel-based. Topics include linear programming, project scheduling, and simulation.

MA SC 414 Statistical Analysis 3(3,0) Application of statistics in management decision making. Emphasis is on the proper design, analysis, and interpretation of planned experiments. Topics include single factor through fractional factorial experiments. *Preq:* MA SC 310 or equivalent.

MARKETING

Professors: L. Carlson, G. M. Pickett, R. M. Reese; *Associate Professors:* M. J. Dorsch, C. R. Duke, R. Gomes, S. J. Grove, P. A. Knowles, M. C. LaForge; *Assistant Professors:* M. Grünhagen, J. D. Mittelstaedt, J. N. Moore, M. A. Raymond

MKT 301, H301 Principles of Marketing 3(3,0) Principles and concepts involved in planning, pricing, promoting, and distributing of goods and services. *Preq:* ACCT 201; ECON 211 or 212; 45 credit hours completed.

MKT 302 Consumer Behavior 3(3,0) Examination of selected individual and group behavioral science concepts and their application to the understanding of consumer decision making. *Preq:* MKT 301.

MKT (E L E) 314 New Venture Creation I 3(3,0) Assessing entrepreneurial opportunities. First in a two-part series (continues as MGT (E L E) 315). Focuses on creativity, idea generation, market opportunity analysis, strategy, and methods of entry. Opportunity analysis may be developed into a full new venture plan in MGT (E L E) 315. *Preq:* Junior standing.

MKT 321 Sports Marketing 3(3,0) Exploration of the essentials of effective sports marketing. Topics include application of marketing principles in the sports area, licensing issues, sponsorships and endorsements, stadium and arena marketing, broadcasting and media considerations, public policy and sports, and unique marketing challenges for sport specific products (football, basketball, baseball, motorsports, etc.). *Preq:* MKT 301 or consent of instructor.

MKT 399 Marketing Internship 3(0,9) Preplanned, preapproved, faculty-supervised marketing internships. Credit will only be given for internships of at least ten full-time, consecutive weeks with the same internship provider. Restricted to students with a major or minor in marketing. To be taken Pass/Fail only. *Preq:* MKT 301 and consent of instructor.

MKT 420 Professional Selling 3(3,0) Current theories about the selling of goods and services to organizational buyers in the context of long-term relationships. Role playing, video-taped presentations, and other techniques are generally employed to enhance interpersonal communication skills. *Preq:* Junior standing.

MKT 423, 623 Promotional Strategy 3(3,0) Emphasis is on promotion as the communication function of marketing. Attention is given to communication theory and promotion's relation to mass and interpersonal communication. Factors affecting the promotional decision-making process are explored, and promotion as a competitive tool is examined. *Preq:* MKT 301 or consent of instructor.

MKT 424 Sales Management 3(3,0) Comprehensive examination of the planning, implementation, and control of professional sales organizations. *Preq:* MKT 301 or consent of instructor.

MKT 425 Retail Management 3(3,0) Retailing is studied from a decision-making approach. Topics include target, market analysis, location analysis, merchandising, human resources, pricing and promotion. *Preq:* MKT 301 or consent of instructor.

MKT 426 Business-to-Business Marketing 3(3,0) Study and analysis of the unique aspects of marketing goods and services to organizational buyers rather than household consumers. Emphasis is on developing strategic responses to market opportunities given competitive behavior. *Preq:* MKT 301 or consent of instructor.

MKT 427, 627 International Marketing 3(3,0) Study of marketing from the international point of view. Emphasis is on the necessary modification of marketing thinking and practice for foreign markets due to individual environmental differences. *Preq:* MKT 301.

MKT 428, 628 Services Marketing 3(3,0) Exploration and study of the nature of service organizations and the principles which guide the marketing of their products. Emphasis is on a marketing mix that is fundamentally different than that found in traditional goods marketing. *Preq:* MKT 301 or consent of instructor.

MKT 429, 629 Public and Nonprofit Marketing 3(3,0) Examines the role and application of marketing in public and nonprofit settings. Focuses on a conceptual understanding of the marketing discipline and marketing processes and shows how basic concepts and principles of marketing are applicable to public and nonprofit organizations. *Preq:* MKT 301 or consent of instructor.

MKT 430, 630 Marketing Product Management 3(3,0) Management of the firm's product or service offerings. Topics include new product screening, evaluation, and development; product line and mix analysis, abandonment decisions, brand manager's role, new product development department, and others. Emphasis is on decision making. *Preq:* MKT 301, MA SC 310; or consent of instructor.

MKT 431, 631 Marketing Research 3(3,0) Research used in marketing decision making. Primary emphasis is on methods and techniques used in planning, collection, processing, and utilization of information. Topics include research design, sources of information, questionnaire design, sampling, data collection and data analysis. *Preq:* MKT 301, MTHSC 301, MA SC 310; or consent of instructor.

MKT 433 Sport Marketing Strategy 3(3,0) Provides students with basic knowledge about brand management as it applies to sport. Addresses basic principles and guiding precepts of how sport-based organizations build strong brands. *Preq:* MKT 321 or consent of instructor.

MKT 434 Sport Promotion 3(3,0) Emphasizes the promotional function of sport. Topics include event sponsorship, developing media relationships, endorsements, promotion objective setting and budgeting, media planning and scheduling, and utilizing the tools of promotion within a sport context. Integrated Marketing Communication provides the theoretical and managerial framework for how these factors are utilized optimally. *Preq:* MKT 321, 423.

MKT 435 International Sport Marketing 3(3,0) Provides working knowledge of international sport marketing. Consists of lecture and site visits. Topics include brief history of sport, sport marketing basics, building sport brands, sport strategies, and issues facing the new sporting goods industry. *Preq:* MKT 301.

MKT 450 Strategic Marketing Management 3(3,0) Application of marketing constructs in the analysis and solution of marketing problems. Emphasis is placed on information systems, data analysis, and critical-thinking skills in solving marketing problems in a wide range of managerial decision areas including, but not limited to, new product development, pricing, advertising, personal selling, channels, and international marketing. *Preq:* MKT 301, six hours of 400-level marketing courses.

MKT 495, 695 Selected Topics 3(3,0) In-depth examination of timely topics in marketing. May be repeated for credit, but only if different topics are covered. *Preq:* MKT 301 or consent of instructor.

MKT 499 Independent Study 1-3(1-3,0) Directed readings or independent research in selected marketing areas. Topics must be selected and proposed by student. Proposals must be approved by instructor. May be repeated for a maximum of three credits. *Preq:* MKT 301, 302, consent of instructor.

MATHEMATICAL SCIENCES

Professors: W. P. Adams, J. R. Brannan, J. V. Brawley, Jr., P. M. Dearing, R. E. Fennell, G. J. Fix III, *Chair;* W. R. Hare, Jr., P. T. Holmes, R. E. Jamison, J. P. Jarvis, J. D. Key, M. M. Kostreva, K. B. Kulasekera, R. C. Laskar, J. K. Luedeman, W. F. Moss III, P. R. Nelson, J. A. Reneke, D. R. Shier, D. D. Warner; *Associate Professors:* N. J. Calkin, C. L. Cox, J. Duan, V. J. Ervin, S. L. Ganter, X. Gao, P. C. Kiessler, J. K. Peterson, C. B. Russell, M. J. Saltzman, H. F. Senter, F. E. Sullivan, M. M. Wiecek, C. L. Williams; *Assistant Professors:* C. M. Gallagher, K. L. James, H. K. Lee, H. D. Sasinowska; *Lecturers:* S. S. Biggers, M. E. Cawood, P. F. Garner, A. A. Guest, J. B. Lassiter, S. A. Prevost; *Visiting Professor:* R. T. Curtis; *Visiting Associate Professors:* D. M. Fairbairn, J. C. Harden, T. A. Johnson; *Visiting Assistant Professors:* J. H. Nicholson, B. A. Novick; *Visiting Instructors:* N. J. Conway, C. A. Davis, S. P. Dooley, M. D. Eberhardt, J. M. Flatt, L. M. Hanna, J. M. LaVare, J. K. Martin, M. I. Massoud, K. L. Miller, A. D. Mozer, T. Parrott, D. M. Simms, S. E. Stasiukaitus, A. K. Stoddard, S. L. Wainscott, S. E. Walker, T. H. Whitaker, C. C. Woodard

MTHSC 100 College Algebra 3(3,1) Basic course to prepare students for subsequent courses in probability, mathematical analysis, elementary statistics and elementary functions (precalculus). Fundamental concepts of algebra, equations, inequalities, functions, and graphs are studied. Students who have received credit for higher numbered mathematical sciences courses will not be allowed to enroll in or receive credit for MTHSC 100.

MTHSC 101 Introduction to Probability 3(3,0) Introductory study of randomness and probability. Major topics include descriptive techniques for data, basic probability concepts, permutations and combinations, discrete distributions, normal and uniform distributions, sampling distributions and the central limit theorem. *Preq:* Satisfactory score on the Clemson Mathematics Placement Test or consent of instructor.

MTHSC 102 Introduction to Mathematical Analysis 3(3,0) Intuitive approach to the concepts and applications of calculus. Topics include functions and graphing, differentiation, and integration. Applications from social, biological, and management sciences are presented. Not open to those receiving credit for MTHSC 106. *Preq:* Satisfactory score on the Clemson Mathematics Placement Test or consent of instructor.

MTHSC 103 Elementary Functions 3(3,1) Gateway course for MTHSC 106. Comprehensive treatment of functions and analytic geometry with applications including polynomial, rational, algebraic, exponential, logarithmic and trigonometric functions. Not open to students who have completed MTHSC 105. *Preq:* MTHSC 100 or satisfactory score on the Clemson Mathematics Placement Test.

MTHSC 105 Precalculus 5(5,1) Extensive treatment of topics chosen to prepare students for the study of calculus. Special emphasis is given to polynomial, rational, exponential, logarithmic, and trigonometric functions and their graphs, as well as basic and analytic trigonometry. Students who have received credit for MTHSC 100, 102, or 106 will not be allowed to enroll in or receive credit for MTHSC 105.

MTHSC 106, H106 Calculus of One Variable I 4(4,0) Topics include analytic geometry, introduction to derivatives, computation and application of derivatives, integrals, exponential and logarithm functions. *Preq:* MTHSC 105 or a satisfactory score on the Clemson Mathematics Placement Test or consent of instructor.

MTHSC 108, H108 Calculus of One Variable II 4(4,0) Topics include infinite series, limits, differentiation and techniques of integration. *Preq:* MTHSC 106.

MTHSC 115 Contemporary Mathematics for Elementary School Teachers I 3(3,0) Cooperative learning groups, manipulatives, and concrete models are used to demonstrate logical reasoning, problem-solving strategies, sets and their operations, numeration systems, properties and operations of whole numbers, number theory, prime and composite numbers, divisibility, common factors and multiples. Open to Elementary, Early Childhood, and Special Education majors only. *Preq:* Satisfactory score on the Clemson Mathematics Placement Test or MTHSC 100.

MTHSC 116 Contemporary Mathematics for Elementary School Teachers II 3(3,0) Continuation of MTHSC 115. Manipulatives and concrete models are used for properties, operations, and problem solving for integers, elementary fractions, rational numbers, and real numbers. Selected topics in statistics and probability are introduced with a hands-on approach to learning. Open to Elementary, Early Childhood, Special Education majors only. *Preq:* MTHSC 115 or consent of instructor.

MTHSC 119 Introduction to Discrete Methods 3(3,0) Topics normally include elementary logic and methods of proof; sets, functions, and relations; graphs and trees; combinatorial circuits and Boolean Albegra. *Preq:* Satisfactory score on the Clemson Mathematics Placement Test.

MTHSC 129 Problem Solving in Discrete Mathematics 3(2,2) Problem-solving approach to learning mathematics is applied to topics in modern discrete mathematics. Typical selection of topics includes logic and proof, sets, relations, functions, mathematical induction, graphs and trees, counting techniques, recurrence equations. For Bachelor of Science and Bachelor of Arts majors in Mathematical Sciences only. Credit may not be received for both MTHSC 119 and 129. *Preq:* MTHSC 106.

MTHSC 203 Elementary Statistical Inference 3(3,0) Survey course in fundamental statistical principles with applications. Topics include estimation, tests of hypotheses, simple linear regression and correlation, analysis of count data, and nonparametric statistics. May not be taken for credit by students who have passed MTHSC 301, 302, or EX ST 301. *Preq:* MTHSC 101.

MTHSC 206, H206 Calculus of Several Variables 4(4,0) Topics include real valued functions of several variables, multiple integration, differential calculus of functions of several variables, vector field theory. *Preq:* MTHSC 108.

MTHSC 207 Multivariable Calculus 3(3,0) Introduction to the calculus of several variables, differential calculus and optimization of several variables, multiple integrals. Topics from the management sciences are used to illustrate the above concepts. May not be taken by students who have passed MTHSC 206. *Preq:* MTHSC 102, or 106 with consent of instructor.

MTHSC 208, H208 Introduction to Ordinary Differential Equations 4(4,0) Introduction to the study of differential equations and their application to physical problems. Topics include exact, series, and numerical solutions; solutions by means of Laplace transforms; and solutions of systems of differential equations. *Preq:* MTHSC 206.

MTHSC 210 Applied Matrix Algebra 3(3,0) Introduction to the basic principles of matrix algebra with applications to the behavioral and managerial sciences. Major areas of application include linear programming, directed graphs, and game theory. *Preq:* MTHSC 101 and 102 or 106.

MTHSC 216 Geometry for Elementary School Teachers 3(3,0) Informal treatment of the basic concepts of geometry. Open to Elementary, Early Childhood, and Special Education majors only. *Preq:* MTHSC 116 or consent of instructor.

MTHSC 231 Mathematics of Life Insurance 3(3,0) Introduction to basic mathematics of finance and life insurance. Topics include compound interest, annuities certain, mortality tables, life annuities, net premiums, net level reserves, modified reserves, nonforfeiture values, and dividends.

MTHSC 232 Actuarial Science Seminar I 1(1,0) Problem-solving seminar designed to prepare students for the Society of Actuaries Examination I (General Mathematics). *Preq:* MTHSC 206.

MTHSC 250 Introduction to Mathematical Sciences 1(1,0) Lectures and discussions on the mathematical sciences disciplines: applied mathematics, computing science, core mathematics, management science, operations research, and statistics. *Preq:* MTHSC 106.

MTHSC 301, H301 Statistical Theory and Methods I 3(3,0) Principal topics include elementary probability theory, discrete and continuous random variables, expected values, normal distribution, chi-square distribution, t-distribution, F-distribution, tests of hypotheses, point and interval estimation, curve fitting. Credit toward a degree will be given for only one of EX ST 301, MTHSC 301, 302. *Preq:* MTHSC 106 or 207 or 210.

MTHSC 302 Statistics for Science and Engineering 3(3,0) [W.1] Methodology for collecting, organizing, and interpreting data. Topics include understanding variability, graphical and numerical summarization of data, introductory probability, normal and related distributions, statistical inference, experimental design, simple linear regression. Statistical microcomputer software is used. Credit toward a degree will be given for only one of EX ST 301, MTHSC 301, or 302. *Preq:* MTHSC 206.

MTHSC 308 College Geometry 3(3,0) Theorems and concepts more advanced than those of high school geometry. Treatment of the various properties of the triangle, including the notable points, lines, and circles associated with it. *Preq:* MTHSC 106.

MTHSC 311, H311 Linear Algebra 3(3,0) Introduction to the algebra of matrices, vector spaces, polynomials, and linear transformations. *Preq:* MTHSC 108 or consent of instructor.

MTHSC 360 Intermediate Mathematical Computing 3(3,0) Continuing study of mathematical computing using the FORTRAN language. Emphasis is on subroutine computation with applications to problems in science and engineering. *Preq:* CP SC 110 or consent of instructor.

MTHSC H382 Honors Seminar 1(1,0) Weekly seminar to prepare students in the Departmental Honors Program for independent senior research. At the end of the second semester, each student must have identified a research topic and a faculty advisor. May be repeated for a maximum of two credits. *Preq:* Junior standing in departmental honors program.

MTHSC 400, H400, 600 Theory of Probability 3(3,0) Principal topics include combinatorial theory, probability axioms, random variables, expected values; special discrete and continuous distributions, jointly distributed random variables, correlation, conditional expectation, law of large numbers, central limit theorem. *Preq:* MTHSC 206 or consent of instructor.

MTHSC 403, H403, 603 Introduction to Statistical Theory 3(3,0) Principal topics include sampling distributions, point and interval estimation, maximum likelihood estimators, method of moments, least squares estimators, tests of hypotheses, likelihood ratio methods, regression and correlation analysis, introduction to analysis of variance. *Preq:* MTHSC 400 or equivalent.

MTHSC 405, 605 Statistical Theory and Methods II 3(3,0) Principal topics include simple linear regression, multiple regression and correlation analysis, one-way analysis of variance, multiple comparison, multifactor analysis of variance, experimental design. Computation and interpretation of results are facilitated through use of statistical computer packages. *Preq:* MTHSC 301.

MTHSC 406, 606 Sampling Theory and Methods 3(3,0) Probability-based treatment of sampling methodology. Theory and application of estimation techniques are treated using simple and stratified random sampling, cluster sampling, and systematic sampling. *Preq:* MTHSC 302 and 400, or consent of instructor.

MTHSC 407, 607 Regression and Time-Series Analysis 3(3,0) Theory and application of the regression and time series. Approaches to empirical model building and data analysis are treated. Computation and interpretation of results are facilitated through the use of interactive statistical packages. *Preq:* MTHSC 302, 311, 400; or consent of instructor.

MTHSC 408, 608 Topics in Geometry 3(3,0) Introduction to topics in special geometries which include non-Euclidean space concepts such as projective geometry, finite geometries, and intuitive elementary topology. Brief introduction to vector geometry. *Preq:* MTHSC 206.

MTHSC 410 Number Theory 3(3,0) Introduction to theory of integers and related number systems. Topics include historical development, principle of mathematical induction, divisibility, primes, congruences, number-theoretic functions, primitive roots, quadratic residues, and diophan-tine equations. *Preq:* MTHSC 108 or consent of instructor.

MTHSC 412, H412, 612 Introduction to Modern Algebra 3(3,0) Introduction to the concepts of algebra. Topics include the number system and the elementary theory of groups, rings, and fields. *Preq:* MTHSC 311.

MTHSC 419, H419, 619 Discrete Mathematical Structures I 3(3,0) Applies theoretical concepts of sets, functions, binary relations, graphs, Boolean algebras, propositional logic, semigroups, groups, homomorphisms, and permutation groups to computer characteristics and design, words over a finite alphabet and concatenation, binary group codes, and other communication or computer problems. *Preq:* MTHSC 311.

MTHSC 432 Actuarial Science Seminar II 1(1,0) Problem-solving seminar to prepare students for the Society of Actuaries Examination 2 (probability and statistics). *Preq:* MTHSC 403 may be taken concurrently or consent of instructor.

MTHSC 434, 634 Advanced Engineering Mathematics 3(3,0) Fourier series, Laplace and Fourier transform, and numerical methods for solving initial value and boundary-value problems in partial differential equations are developed. Applications to diffusion wave and Dirichelet problems are given. Matrix methods and special functions are utilized. *Preq:* MTHSC 208.

MTHSC 435, H435, 635 Complex Variables 3(3,0) Elementary functions; differentiation and integration of analytic functions; Taylor and Laurent series; contour integration and residue theory; conformal mapping; Schwartz-Christoffel transformation. *Preq:* MTHSC 206.

MTHSC 440, H440, 640 Linear Programming 3(3,0) Introduction to linear programming covering the simplex algorithm, duality, sensitivity analysis, network models, formulation of models, and the use of simplex codes to solve, interpret, and analyze problems. *Preq:* MTHSC 206, 311, or consent of instructor.

MTHSC 441, H441, 641 Introduction to Stochastic Models 3(3,0) Introductory treatment of stochastic processes, finite-state Markov chains, queueing, dynamic programming, Markov decision processes, reliability, decision analysis, and simulation. Both theory and applications are stressed. *Preq:* MTHSC 400.

MTHSC 450 Introduction to Mathematical Models 3(3,0) Study of the modeling process which includes translation of practical problems into mathematical models, solution of the mathematical models, and interpretation of the solution back into practical problems. Examples are chosen from the physical, biological, social, and management sciences. *Preq:* CP SC 110, MTHSC 208.

MTHSC 453, H453, 653 Advanced Calculus I 3(3,0) Limits, continuity, and differentiation of functions of one and several variables, the Riemann integral, and vector analysis. *Preq:* MTHSC 206.

MTHSC 454, H454, 654 Advanced Calculus II 3(3,0) Continuation of MTHSC 453. Transformations, multiple integrals, line and surface integrals, infinite sequences and series, and improper integrals. *Preq:* MTHSC 453.

MTHSC 460, 660 Introduction to Numerical Analysis I 3(3,0) Introduction to the problems of numerical analysis emphasizing computational procedures and application. Topics include sources of error and conditioning, matrix methods, systems of linear equations, nonlinear equations, interpolation and approximation by splines, polynominals, and trigonometric functions. *Preq:* MTHSC 206 or 207 and 360 or eqivalent.

MTHSC 463, H463, 663 Mathematical Analysis I 3(3,0) Basic properties of the real number system, sequences and limits; continuous functions, uniform continuity and convergence. Integration, differentiation, functions of several real variables, implicit function theory. *Preq:* MTHSC 206.

MTHSC 481 Seminar in Mathematics 1-3(1-3,0) Attention is focused on mathematical areas in which nonroutine problems can be posed with comparative ease. Emphasis is on independent study and student use of previously acquired mathematical skills. Open to students only by invitation for not more than three hours credit.

MTHSC H482 Honors Research 3(3,0) Independent research, conducted under the supervision and guidance of a faculty member for students enrolled in Departmental Honors Program. May be repeated once for a maximum of six credits. *Preq:* MTHSC H382.

MECHANICAL ENGINEERING

Professors: D. E. Beasley, S. B. Biggers, M. W. Dixon, R. S. Figliola, *Chair;* J. L. Gaddis, M. Grujicic, I. Haque, C. O. Huey, Jr., J. M. Kennedy, E. H. Law, F. W. Paul, C. E. G. Przirembel, D. A. Zumbrunnen; *Associate Professors:* G. M. Fadel, P. F. Joseph, J. H. Leylek, J. M. Ochterbeck; *Assistant Professors:* E. M. Austin, N. Jalili, E. Marotta, J. R. Saylor, L. L. Thompson, C. Tong, J. R. Wagner, J. D. Wood; *Lecturers:* J. B. Riester, C. K. Roby; *Adjunct Professors:* B. Han, J. L. Liburdy, C. D. Rahn, P. M. Taylor

M E 202 Foundations of Mechanical Systems 3(3,0) Introduction to basic physical elements of mechanical engineering systems. Problem-solving, design, and resourceful application of mathematics and general principles from students' science courses are emphasized throughout. *Preq:* MTHSC 108, PHYS 122, E M 201 (or concurrent enrollment).

M E 203 Foundations of Thermal and Fluid Systems 3(3,0) Introduction to control volumes, conservation laws of mass, momentum, and energy. Concepts of work and heat are introduced, including rate forms. Properties of pure substances. *Preq:* MTHSC 206, PHYS 221.

M E 205 Computer Analysis in Engineering 2(2,0) [C.1] Application of undergraduate mathematics and basic engineering principles with an emphasis on numerical methods and the use of mathematical software packages in the solution of engineering problems. Problems are drawn from dynamics, vibrations, kinematics, thermodynamics, heat transfer, materials engineering, fluid mechanics, and other engineering fields. *Preq:* ENGR 120, MTHSC 208 (or concurrent enrollment), PHYS 122, Mechanical Engineering major.

M E 221 Mechanical Engineering Laboratory I 1(0,3) Discovery of mechanical engineering principles and phenomena. Introduction to laboratory safety practices, instrumentation, calibration techniques, data analysis, and report writing. *Preq:* M E 202 (or concurrent enrollment), 203 (or concurrent enrollment), PHYS 221.

M E H300 Junior Honors Seminar 0 Acquaints students enrolled in Departmental Honors Program with current research activities in the Department of Mechanical Engineering. Faculty provide seminars where research interests are summarized. These seminars are planned to prepare students in choosing a research topic for the senior thesis. *Preq:* Junior standing in departmental honors program.

M E 301 Materials for Mechanical Engineering Applications 3(3,0) Properties and selection of materials of interest to mechanical engineers. Emphasis is on the interrelations between the microstructure, processing, and properties of materials. *Preq:* CH 102, E M 304 (or concurrent enrollment).

M E 303 Thermodynamics 3(3,0) Study of the second law and entropy; applications to fixed mass systems and control volumes; vapor and gas power cycles; mixtures of gases; vapor psychrometrics; combustion and the third law. Thermochemical equilibrium. *Preq:* M E 203.

M E 304 Heat Transfer 3(3,0) Steady and transient heat conduction, free and forced convection, radiation, and multi-mode heat transfer. Emphasis is on analytical and numerical solutions to engineering heat transfer problems with a design orientation. *Preq:* E M 320 and either M E 203 or 311.

M E 305 Modeling and Analysis of Dynamic Systems 3(3,0) Techniques for developing and analyzing physical and mathematical models of mechanical and electromechanical systems are presented. Transient and frequency response are determined using analytical and numerical methods. Basic feedback systems are introduced. *Preq:* E C E 307, E M 202, M E 202, 205, MTHSC 208.

M E 306 Fundamentals of Machine Design 3(3,0) Introduction to failure theory, fatigue analysis, and energy methods for deflection analysis. Integration of these topics with selected portions of mechanics of materials and application of them to the design and analysis of machine elements. *Preq:* E M 304.

M E 310 Thermodynamics and Heat Transfer 3(3,0) Introduction to thermodynamics and heat transfer for nonmajors: properties of liquids and gases, first and second law analysis, introduction to cycles for power and refrigeration, heat flow by conduction and radiation, and convective heat flow and heat exchangers. *Preq:* Junior standing in an engineering curriculum.

M E 322 Mechanical Engineering Laboratory II 2(1,3) Mechanical engineering principles and phenomena are reinforced through student conducted experiments. Presentation of fundamentals of instrumentation, calibration techniques, data analysis, and report writing in the context of laboratory experiments. *Preq:* E M 304 (or concurrent enrollment), 320 (or concurrent enrollment), M E 303 (or concurrent enrollment), M E 221, MTHSC 208.

M E 323 Mechanical Engineering Laboratory III 2(1,3) Continuation of M E 322. Mechanical engineering principles and phenomena are reinforced through student-conducted experiments. Presentation of fundamentals of instrumentation, calibration techniques, data analysis, and report writing in the context of laboratory experiments. *Preq:* M E 301 (or concurrent enrollment), 304 (or concurrent enrollment), 305 (or concurrent enrollment), 306 (or concurrent enrollment), M E 322, MTHSC 302 or EX ST 411.

M E 400 Senior Seminar 1(1,0) Seminars address the problems encountered by engineering graduates in professional practice. Invited lecturers as well as faculty provide the lectures and demonstrations. *Preq:* All required 300-level E C E, E M, and M E courses or approval of instructor.

M E 401 Mechanical Engineering Design 3(3,0) [O.1, W.2] Project-oriented course in mechanical engineering. Emphasis is on the role of analysis, synthesis, and evaluation in design and on written reporting of design solutions. Influence of economics and optimization, concurrent development, integration of design and manufacturing, and system creation are utilized for engineering design decisions. *Preq:* M E 301, 303, 304, 305, 306 (Concurrent enrollment in one of these courses is permitted with departmental approval.)

M E 402 Internship in Engineering Design 3(1,6) [O.2, W.1] Creative application of general engineering knowledge in solving an open-ended design problem provided by a sponsor typically external to the University. Progress is evaluated by a faculty jury. Students present results to the jury and sponsor through written reports and oral presentations addressing University written/oral competency goals. *Preq:* M E 401, 404 (or concurrent enrollment).

M E 404 Manufacturing Processes and Their Application 3(3,0) Fundamental principles associated with production processes and their application to the manufacture of products from metals, polymers, ceramics, and composites. Emphasizes the physical and quantitative aspects of processing, the selection of processes to create products, and the identification of processes used to manufacture existing products. *Preq:* M E 301, 303, 304, 305, 306, 323.

M E 405 Kinematics and Dynamics of Machinery I 3(3,0) Graphical, analytical, and numerical techniques are used in the dynamic analysis and synthesis of machines. Emphasis is on the application of these analysis techniques to planar linkages. *Preq:* E M 202, 304, M E 205.

M E 407, 607 Applied Heat Transfer 3(3,0) Application oriented extension of M E 304, considering topics in transient conduction, flow of fluids, energy exchange by radiation, and mass transfer. Applications in heat-exchanger design with emphasis on economics and variation of operating conditions from the design point. *Preq:* M E 304, consent of instructor.

M E 415, H415 Undergraduate Research 1-3 Individual research projects conducted under the direct supervision and guidance of a faculty member. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

M E 416 Control of Mechanical Systems 3(3,0) Physical modeling and feedback principles are presented for control of mechanical systems. Transient response, root locus, and frequency response principles are applied to the control of basic mechanical systems such as electric motors, fluid tanks, or thermal processes. PID control laws are emphasized. *Preq:* M E 305, 322, 323.

M E 417, 617 Mechatronics System Design 3(3,0) Mechatronics integrates control, sensors, actuators, and computers to create a variety of electromechanical products. Includes concepts of design, appropriate dynamic system modeling, analysis, sensors, actuating devices, and real time microprocessor interfacing and control. Case studies, simulation, and projects are used to exemplify the system design principles. *Preq:* M E 305 or consent of instructor.

M E 418 Finite Element Analysis in Mechanical Engineering Design 3(2,3) Introduction to the finite element method. Introduction to solid modeling, finite element modeling and analysis using commercial codes. Analysis strategies using finite elements. Applications to heat transfer, fluid flow, and structures. *Preq:* E M 304, 320, M E 205, 304, or consent of instructor.

M E 420, 620 Energy Sources and Their Utilization 3(3,0) Covers availability and use of energy sources such as fossil fuels, solar (direct and indirect), and nuclear; addresses energy density and constraints to use (technical and economic) for each source. *Preq:* M E 303, 304.

M E 421, 621 Introduction to Compressible Flow 3(3,0) Introductory concepts to compressible flow; methods of treating one-dimensional gas dynamics including flow in nozzles and diffusers, normal shocks, moving and oblique shocks, Prandtl-Meyer Flow, Fanno Flow, Rayleigh Flow, and reaction propulsion systems. *Preq:* E M 320, M E 303.

M E 422, 622 Design of Gas Turbines 3(3,0) Guiding principles in gas turbine cycles are reviewed. Turbine and compressor design procedures and performance prediction for both axial and radial flow machines are presented. Methods of design of rotary heat-exchangers and retrofitting gas turbine for regenerative operation are presented. Design projects are used to illustrate the procedures. *Preq:* E M 320.

M E 423, 623 Introduction to Aerodynamics 3(3,0) Basic theories of aerodynamics are presented for the purpose of accurately predicting the aerodynamic forces and moments which act on a vehicle in flight. *Preq:* E M 320.

M E 424 Mechanical Engineering Laboratory IV 1(0,3) Continuation of M E 323. Mechanical engineering principles and phenomena are reinforced through open-ended, student designed and conducted experiments. Utilization of mature skills in measurement techniques, data analysis, and report writing. *Preq:* M E 301, 303, 304, 305, 306, 323; M E 404 (or concurrent enrollment).

M E 425, 625 Kinematics and Dynamics of Machinery II 3(3,0) Graphical, analytical, and numerical techniques are used in the dynamic analysis and synthesis of machines. Emphasis is on the application of the analysis techniques to cams, gears, and other mechanisms. *Preq:* M E 405.

M E 429, 629 Thermal Environmental Control 3(3,0) Mechanical vapor compression refrigeration cycles, refrigerants, thermoelectrical cooling systems, cryogenics, thermodynamic properties of air, psychometric charts, heating and cooling coils, solar radiation, heating and cooling loads, insulation systems. *Preq:* E M 320, M E 303.

M E 431 Applied Fluids Engineering 3(3,0) Applications-oriented course in industrial fluids engineering, primarily directed toward the analysis and design of piping systems and components for liquid and gas flow. Topics include friction factors, head loss, flow capacities, piping networks, flow measurement, pumps, control valves, and hydraulic and pneumatic components. *Preq:* E M 320, M E 322.

M E 440 Materials for Aggressive Environments 3(3,0) Emphasizes the engineering aspects of selecting materials for applications in aggressive environments. Various types of materials degradation are discussed as are methods for wastage prevention, including especially engineering design and materials selection approaches. Structural metallic alloys are emphasized; however, technically important ceramics and polymers are also discussed. *Preq:* M E 301, 306.

M E 453, 653 Dynamic Performance of Vehicles 3(3,0) Introduces techniques for analyzing the dynamic behavior of vehicles. Types of vehicles to be considered are chosen from aircraft, surface ships, automobiles and trucks, railway vehicles, and magnetically levitated vehicles. *Preq:* M E 205, 305, or consent of instructor.

M E 454, 654 Design of Machine Elements 3(3,0) Design of common machine elements including clutches, brakes, bearings, springs, and gears. Optimization techniques and numerical methods are employed as appropriate. *Preq:* M E 306 or consent of instructor.

M E 455, 655 Design for Computer-Automated Manufacturing 3(3,0) Concepts of product and process design for automated manufacturing are considered. Topics include product design for automated manufacturing, inspection and assembly, using automation, industrial robots, knowledge-based systems and concepts of flexible product manufacture. *Preq:* M E 301, 306, 404 (or concurrent enrollment), or consent of instructor.

M E (E C E) 456 Fundamentals of Robotics 3(3,0) Introduction to the fundamental mechanics and control of robots, including their application to advanced automation. Topics include robot geometry, kinematics, dynamics, and control. Planar machine structures are emphasized, including methods using computer analysis. Application considerations include the design and operation of robot systems for manufacturing and telerobotics. *Preq:* M E 305, 416 (or concurrent enrollment), or consent of instructor.

M E 471 Computer Aided Engineering Analysis and Design 3(3,0) Students are exposed to geometric and solid modeling, finite elements, optimization, and rapid-prototyping. Students design an artifact, represent it on the computer, analyze it using FEA, then optimize before prototyping it. Emphasizes the use of computer-based tools for engineering design. The World Wide Web is used for reporting. *Preq:* Numerical methods and programming experience or consent of instructor.

M E 493, 693 Selected Topics in Mechanical Engineering 1-6 (1-6,0) Study of topics not found in other courses. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

MICROBIOLOGY

Professors: S. S. Hayasaka, *Chair*; R. H. Hilderman, T. A. Hughes, E. L. Kline, L. L. Larcom, J. W. Lawson, Jr., M. J. B. Paynter, T. E. Schwedler, F. J. Stutzenberger, T. R. Wilkinson; *Assistant Professors:* W. Y. Chen, M. W. Kilgore, Y. Wei, X. Yu; *Lecturer:* T. R. Tzeng

MICRO 100 Microbes and Human Affairs 1(1,0) Explanation of the roles of microorganisms in today's world and the significance of microbes to the future of mankind.

MICRO 205 Introductory Microbiology 4(3,3) Basic concepts of microbiology, introduced through classroom and laboratory experiences. Emphasis is on practical applications in various areas of importance to man. Recommended for students not majoring in a biological science. Not open to Microbiology majors. *Preq:* CH 101, 102, BIOL 103.

MICRO 305, 605 General Microbiology 4(3,3) Morphology, physiology, classification, distribution, and cultivation of microorganisms. *Preq:* Introductory biology, CH 101, 102.

MICRO 400, 600 Public Health Microbiology 3(3,0) Epidemiology of transmissible diseases including pathogenic characteristics of the infectious organism, modes of transmission, mechanism of infection, diagnostic aids, effective treatments, immunizing procedures and methods of preventing infection. *Preq:* MICRO 305.

MICRO 401, H401, 601 Advanced Bacteriology 4(2,6) Metabolism, nutrition, growth, and death of bacteria; microbiological assays and industrial fermentation; emphasis on laboratory procedures for the identification of the more common taxonomic groups. *Preq:* CH 201 or 223, 227, MICRO 305.

MICRO 403, 603 Marine Microbiology 3(2,3) Discussion of the microbes that inhabit the marine environment, their peculiar physiological traits, and contributions to the ecology of oceans. *Preq:* MICRO 305, organic chemistry.

MICRO 407, H407, 607 Food and Dairy Microbiology 4(3,3) Physical-chemical factors limiting survival and growth of microorganisms during processing and manufacturing of food and dairy products. Standard methods for enumerating and identifying indicator bacteria, yeasts, molds, and microbes producing food and food-borne illness. Starter cultures, fungal toxins, microbial cell injury and standards for food and dairy products. *Preq:* BIOCH 210 or CH 201 or 223, MICRO 305.

MICRO 410, H410, 610 Soil Microbiology 3(2,3) Role of microorganisms in the decomposition of organic substances, transformation of nitrogen and mineral substances in the soil; interrelationships between higher plants and microorganisms; importance of microorganisms in soil fertility. *Preq:* MICRO 305.

MICRO 411, H411, 611 Pathogenic Bacteriology 4(3,3) Study of pathogenic bacteria, their morphology, cultural requirements and classification; diagnostic tests, methods of differentiation, and the diseases caused. *Preq:* MICRO 305.

MICRO 412, H412, 612 Bacterial Physiology 4(3,3) Consideration of the cytology, physiology, metabolism, and genetics of bacteria. Includes studies of growth and death, reproduction and mutation, nutrition and metabolic pathways, regulatory mechanisms, and effects of environment. *Preq:* CH 224, MICRO 305, one semester of biochemistry, or consent of instructor.

MICRO 413, H413, 613 Industrial Microbiology 3(2,3) Microbial aspects of large-scale processes for the production of foods, antibiotics, enzymes, fine chemicals, and beverages. Topics include strain selection, culture maintenance, biosynthetic pathways, continuous cultivation and production of single cell protein. *Preq:* MICRO 305.

MICRO 414, H414, 614 Basic Immunology 3(2,3) Consideration of the nature, production, and function of basic immune responses in animals. Procedures and mechanisms of antigen-antibody and other immune reactions. *Preq:* MICRO 305, organic chemistry.

MICRO 415, H415, 615 Microbial Genetics 4(3,3) Cytological basis of bacterial, fungal, and viral genetics; molecular aspects; mutations; mechanisms of genetic transfers; episomes and plasmids; and population changes. *Preq:* BIOCH 301, CH 224, MICRO 305, or consent of instructor.

MICRO 416, H416, 616 Introductory Virology 3(3,0) General introduction to the field of virology, including animal, bacterial, and plant viruses. Topics include nomenclature and classification, biochemical and biophysical characteristics, mechanisms of replication, chemotherapy, and techniques for isolation, assay, and purification. *Preq:* BIOCH 301, MICRO 305, or consent of instructor.

MICRO 417, H417, 617 Molecular Mechanisms of Carcinogenesis and Aging 3(3,0) Changes which occur at the cellular and subcellular levels during transformation and aging. Accumulated damage and "intrinsic clock" theories of aging; genetic and epigenetic theories of carcinogenesis; epidemiology of cancer; viral, radiation-induced, and chemical carcinogenesis; the immune system and cancer. *Preq:* BIOCH 301, MICRO 305, or consent of instructor.

MICRO 418, 618 (BIOSC, GEN) Biotechnology I: Nucleic Acids Techniques 4(2,4) See BIOSC 418.

MICRO 419, 619 Selected Topics in Molecular Medicine 3(3,0) Introduction to various areas of molecular medicine. Examines the latest research and developments in molecular medicine. Designed for students interested in medicine and biomedical research. Graduate students may repeat for a total of six credits. *Preq:* MICRO 305, BIOCH 301, or permission of instructor.

MICRO 491 Special Problems in Microbiology 1-3(0,3-9) Research problems in various areas of microbiology which introduce undergraduate students to the planning and execution of research experimentation and the presentation of research findings. May be repeated with advisor's approval.

MICRO H491 Honors Special Problems in Microbiology 3(0,9) Research problems in various areas of microbiology which introduce undergraduate students to the planning and execution of research experimentation and the presentation of research findings. May be repeated with consent of instructor. *Preq:* Membership in Calhoun Honors College Program, consent of instructor.

MILITARY SCIENCE

Professor: W. R. Hanson, *Chair; Assistant Professors:* D. M. Bedard, R. L. DuBreuil, K. G. Mangan, G. J. Walker

M S 101 Military Science (Basic) 1(1,2) Examines the role of the Army in today's society, ranks and branches of the Army, principles and techniques of leadership. Laboratory periods provide training in physical conditioning, mountaineering, and weapons safety and firing. One-hour lecture per week; two-hour laboratory every other week or equivalent.

M S 102 Military Science (Basic) 1(1,2) Study of Army organization and doctrine with additional focus on pay and allowances, other forces, the noncommissioned officer, and fundamentals of first aid. Laboratories provide training in mountaineering, weapons safety and firing, and land navigation.

M S 103 Becoming a Leader 3(3,0) Study of basic leadership, covering leadership theory and skills, organizational systems to support leaders, problem solving, values and ethics, and communication skills. Includes lecture, practical exercises, and guest speakers.

M S 201 Military Science (Basic) I 1(1,2) Introductory study of U.S. Military Weapons Systems. Emphasis is on the historical and practical perspectives of current U.S. Army weaponry. Leadership laboratory provides students practical experience in applying principles learned and experience in leadership and physical fitness.

M S 202 Military Science (Basic) II 1(1,2) Introduction to principles or warfare and introduction to military land navigation. Leadership laboratory provides students practical experience in applying principles learned in class, in addition to experience in leadership and physical training.

M S 301 Military Science (Advanced) 2(1,2) Study of leadership with a concentration on ethics and values required in professional service. Emphasis is on management skills, effective communication, and study of military training and doctrine. Cadets participate in leadership laboratory and train basic-course cadets on military skills including rappelling, land navigation, and small unit tactics. *Preq:* M S 101, 102, 201, 202.

M S 302 Military Science (Advanced) 3(2,2) Study of leadership with a concentration on small unit operations and tactics. Emphasis is on planning, executing, and assessing military training using situational training exercises and decision support matrices. Continuation of leadership laboratory. *Preq:* M S 301.

M S 401 Military Science (Advanced) 2(1,2) Study of leadership emphasizing written and oral communication skills, military operations, small unit leadership and administration. Students demonstrate leadership ability by training, motivating, and counseling subordinates. Leadership laboratories provide requisite knowledge and experience for commissioning and initial military assignment. *Preq:* M S 302, Advanced Camp (Summer Training)

M S 402 Military Science (Advanced) 3(2,2) Continuation of M S 401. Emphasis is on oral communication and military briefing experience. Students conduct a battle analysis, a study of military law and justice, and a study of professional ethics and values. Leadership laboratories provide requisite knowledge and experience for commissioning and initial military assignment. *Preq:* M S 401.

MUSIC

Professors: R. E. Goodstein, *Chair;* L. U. Harder, D. R. Rash; *Associate Professors:* N. M. Hosler, A. R. Levin; *Assistant Professors:* P. L. Buyer, L. L. Li-Bleuel; *Instructor:* S. C. Lehmkuhl; *Lecturer:* L. Dzuris

MUSIC 101 Beginning Class Piano I 1(0,2) Thorough introduction to basic keyboard skills including solo and ensemble repertoire, technique, applied keyboard theory, and performance. Applied music fee is assessed. *Preq:* Consent of instructor.

MUSIC 102 Beginning Class Piano II 1(0,2) Continued work on keyboard skills, applied keyboard theory, solo and ensemble repertoire, and performance. Applied music fee is assessed. *Preq:* MUSIC 101 or consent of instructor.

MUSIC 111 Beginning Class Guitar 1(0,2) Introduction to basic guitar skills, including fingerstyle technique, strumming, and song accompaniment. Students develop skills and appreciation of the discipline through teacher-led drills, ensemble playing, and the exploration of guitar history, style, and the impact of various players and composers on the medium. Applied music fee is assessed. *Preq:* Consent of instructor.

MUSIC 121 Beginning Class Voice 1(0,2) Introduction to basic vocal skills, including breathing, tone production, diction, intonation, and interpretation. Includes solo and ensemble repertoire. In-class group and individual performances are required. Applied music fee is assessed. *Preq:* Consent of instructor.

MUSIC 151 Applied Music 1(0,1) Individual study in performance medium (piano, voice, strings, woodwinds, brass, percussion, guitar, organ, or carillon). One 30-minute lesson each week, for which a minimum of four hours practice is required. May be repeated for credit with departmental approval of differing performance media. Applied music fee is assessed. *Preq:* Consent of instructor, based upon a qualifying audition.

MUSIC 152 Applied Music 1(0,1) Continuation of MUSIC 151. May be repeated for credit with departmental approval of differing performance media. Applied music fee is assessed. *Preq:* MUSIC 151.

MUSIC 153 Applied Music for Majors 1(0,1) Individual study in vocal or instrumental performance (voice, woodwinds, brass, strings, percussion or keyboards). One 45-minute lesson each week. May be repeated for credit on other performance media with departmental approval. Jury required. Applied music fee is assessed. *Preq:* Performing Arts major (music concentration) and consent of instructor, based upon qualifying audition.

MUSIC 154 Applied Music for Majors 1(0,1) Continuation of MUSIC 153. May be repeated for credit on other performance media with departmental approval. Jury and performance on a recital are required. Applied music fee is assessed. *Preq:* MUSIC 153, consent of instructor.

MUSIC 180 Introduction to Music Technology 3(2,3) Introduction to music notation, sequencing, digital audio, sound reinforcement, analog and digital recording, and other current music technologies. *Preq:* Performing Arts major or consent of instructor.

MUSIC 205 Music Theory I 3(2,2) Terminology and notation of traditional music are reviewed, and the techniques of sight-singing and melodic dictation are practiced. Harmonic practices are studied, relating to the principal diatonic triads in all inversions. *Preq:* Consent of instructor, based on musical literacy.

MUSIC 206 Music Theory II 3(2,2) Continuation of MUSIC 205 with emphasis on diatonic triads and seventh chords in all inversions, nonchord tones, and basic elements of musical form. Practice in sight singing, melodic dictation, and harmonic dictation is included. *Preq:* MUSIC 205.

MUSIC 210, H210 Music Appreciation: Music in the Western World 3(3,0) Deepens students' appreciation of their musical heritage through study of the elements of the musical language and its development in Western culture.

MUSIC 251 Applied Music 1(0,1) Continuation of MUSIC 152. Students are required to perform appropriate solos in student recitals. Applied music fee is assessed. *Preq:* MUSIC 152, consent of instructor.

MUSIC 252 Applied Music 1(0,1) Continuation of MUSIC 251. Students are required to perform appropriate solos in student recitals. Applied music fee is assessed. *Preq:* MUSIC 251, consent of instructor.

MUSIC 253 Applied Music for Majors 1(0,1) Continuation of MUSIC 154. May be repeated for credit on other performance media with departmental approval. Jury is required. Applied music fee is assessed. *Preq:* MUSIC 154, consent of instructor.

MUSIC 254 Applied Music for Majors 1(0,1) Continuation of MUSIC 253. May be repeated on other performance media with departmental approval. Jury and performance on a recital are required. Applied music fee is assessed. *Preq:* MUSIC 253, consent of instructor.

MUSIC 279 Music Laboratory 1(0,3) Practical work in music on productions designed for public presentation. Emphasis is placed on sound support, amplification, and mixing. May be repeated for a maximum of four credits.

MUSIC 310 Survey of Music History 3(3,0) Comprehensive survey of the Western art music tradition from the Middle Ages to the present. *Preq:* MUSIC 206, Performing Arts major; or consent of instructor.

MUSIC 311 History of American Music 3(3,0) Music in America from 1620 to the present. Indigenous and borrowed influences are examined.

MUSIC 312 History of Jazz 3(3,0) Comprehensive survey of jazz elements and styles. A historical perspective from Dixieland to bebop to jazz/rock is included.

MUSIC 313 History of Rock and Roll 3(3,0) Comprehensive survey of rock elements, styles, and artists. Emphasis is on the evolution of rock and roll including a broad examination of musical influences. Course content examines how rock and roll both reflected and influenced social issues.

MUSIC 314 World Music 3(3,0) Introduction to ethnomusicology and music of the world's peoples. Emphasis is placed on music through culture.

MUSIC 321 Principles of Piano Performance I 3(3,0) In-depth study of the principles of piano performance focusing on how to interpret a musical score, develop technical skills and practice techniques, and use the body correctly at the keyboard. *Preq:* By audition.

MUSIC 322 Principles of Piano Performance II 3(3,0) Continuation of MUSIC 321. *Preq:* MUSIC 321 or consent of instructor.

MUSIC 323 Piano Accompanying I 1(0,3)[1] Group study in piano accompanying. Focus on sight-reading and choral, vocal, and instrumental accompanying. Students take group lessons and accompany choral groups and/or applied music students. *Preq:* Consent of instructor.

MUSIC 325 CU Carillonneurs 1(0,2)[1] Group study in playing the 47-bell University carillon. One two-hour meeting each week for which a minimum of two hours of individual practice is required. Participation in a recital is required. *Preq:* Musical keyboard experience, consent of the instructor.

MUSIC 330 Small Ensemble 1(0,3)[1] Ensembles: devoted to the musical training of instrumental, vocal ensemble members through reading and rehearsal of appropriate music; public performances are given periodically in addition to the minimum rehearsal time. Enrollment in simultaneous sections is allowed. *Preq:* Consent of director.

MUSIC 331 Pep Band 1(0,3)[1] Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given in addition to the minimum rehearsal time. Simultaneous enrollment in multiple sections is allowed. *Preq:* Consent of director.

MUSIC 332 Woodwind Quintet 1(0,3)[1] Ensembles: advanced study of woodwind chamber music media. One one-hour class meeting each week, for which a minimum of two hours of ensemble practice is required. *Preq:* By audition only; concurrent enrollment in MUSIC 362.

MUSIC 333 String Quartet 1(0,3)[1] Ensembles: advanced study of string quartet repertoire. Two 90-minute meetings each week for which a minimum of two hours of practice is required. *Preq:* By audition only. *Coreq:* MUSIC 369, Applied Music.

MUSIC 334 Flute Choir 1(0,3)[1] Ensembles: study of flute ensemble literature. One 60-minute meeting each week for which a minimum of two hours of practice is required. *Preq:* By audition only.

MUSIC 336 Percussion Ensemble 1(0,2)[1] Ensembles: study and performance of percussion ensemble literature. One two-hour class meeting each week, for which a minimum of two hours of individual practice is required. *Coreq:* MUSIC 331, 362, 363, 364, or 369.

MUSIC 341 Men's Breakout Ensemble 1(0,2)[1] Small ensembles: study of male a cappella/popular music on an advanced level. *Coreq:* MUSIC 370 or 372 or consent of instructor.

MUSIC 342 Women's Breakout Ensemble 1(0,2)[1] Small ensembles: study of women's a cappella/popular vocal music on an advanced level. Enrollment is limited, and priority will be given to students who are enrolled in a large choral ensemble. *Coreq:* MUSIC 370 or 371 or consent of instructor.

MUSIC 343 Men's Small Ensemble 1(0,2)[1] Small ensembles: study of male a cappella/popular, barbershop, and nostalgic music on an advanced level. *Coreq:* MUSIC 370 or 372 or consent of instructor.

MUSIC 344 Vocal Jazz Ensemble 1(0,3)[1] Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given periodically in addition to the minimum rehearsal time. *Coreq:* MUSIC 370, 371, 372 or consent of instructor.

MUSIC 351 Applied Music 1(0,1) Continuation of MUSIC 252. Students are required to perform an appropriate solo in a student recital. Applied music fee is assessed. *Preq:* MUSIC 252, consent of instructor.

MUSIC 352 Applied Music 1(0,1) Continuation of MUSIC 351. Students are required to perform an appropriate solo in a student recital. Applied music fee is assessed. *Preq:* MUSIC 351, consent of instructor.

MUSIC 353 Applied Music for Majors 1(0,1) Continuation of MUSIC 254. May be repeated on other performance media with departmental approval. Jury is required. Applied music fee is assessed. *Preq:* MUSIC 254, consent of instructor.

MUSIC 354 Applied Music for Majors 1(0,1) Continuation of MUSIC 353. May be repeated on other performance media with departmental approval. Jury and a half-recital performance are required. Applied music fee is assessed. *Preq:* MUSIC 353, consent of instructor.

MUSIC 361 Marching Band 1(0,3)[1]F Ensembles: devoted to musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given periodically in addition to the minimum rehearsal time. *Preq:* Consent of director.

MUSIC 362 Symphonic Band 1(0,3)[1] Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given periodically in addition to the minimum rehearsal time. *Preq:* Consent of director.

MUSIC 363 Jazz Ensemble 1(0,3)[1] Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given periodically in addition to the minimum rehearsal time. *Preq:* Consent of director.

MUSIC 364 Concert Band 1(0,2)[1] Devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given periodically in addition to the minimum rehearsal time. *Preq:* Consent of director.

MUSIC 369 Symphony Orchestra 1(0,3)[1] Mid-sized, college-community orchestra devoted to performing works from standard repertoire. Weekly evening rehearsals with one or more performances per semester. *Preq:* Consent of director.

MUSIC 370 Clemson University Singers 1(0,3)[1] Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given periodically in addition to the minimum rehearsal time. *Preq:* Consent of director.

MUSIC 371 Women's Glee 1(0,3)[1] Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given in addition to the minimum rehearsal time. *Preq:* Consent of director.

MUSIC 372 Men's Glee 1(0,3)[1] Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given in addition to the minimum rehearsal time. *Preq:* Consent of director.

MUSIC 373 University Chorus 1(0,3)[1] Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given periodically in addition to the minimum rehearsal time. *Preq:* Consent of director.

MUSIC 398 Special Topics in Music 3(3,0) Consideration of select areas of study in music not addressed by other music course offerings. May be repeated once for credit. *Preq:* Consent of instructor.

MUSIC 400 Music in the Elementary Classroom 3(3,0) Gives teachers in the elementary classroom a familiarity with traditional, Kodaly, Orff, and Kindermusik approaches in correlating music with language arts, mathematics, and social studies.

MUSIC 415 Music History to 1750 3(3,0) Development of Western music from antiquity to 1750, emphasizing representative literature from various styles and periods. *Preq:* MUSIC 210, 310, or consent of instructor.

MUSIC 416 Music History Since 1750 3(3,0) Continuation of MUSIC 315. Music from 1750 to the present. *Preq:* MUSIC 210, 310, or consent of instructor.

MUSIC 430 Conducting 3(3,0) Study of choral and instrumental conducting. Emphasis is on manual conducting techniques, attitudes, philosophies, and responsibilities necessary for the preparation, planning, and execution of artistic conducting. *Preq:* MUSIC 205 or consent of instructor.

MUSIC 451 Applied Music 1(0,1) Continuation of MUSIC 352 for exceptional students, guiding the student in interpretation of advanced solo and ensemble literature. Minimum of eight hours weekly practice is required. Students are also required to perform an appropriate solo in a student recital. Applied music fee is assessed. *Preq:* MUSIC 352 and consent of instructor.

MUSIC 452 Applied Music 1(0,1) Continuation of MUSIC 451. Students are required to present a recital. Applied music fee is assessed. *Preq:* MUSIC 451 and consent of instructor.

MUSIC 453 Applied Music for Majors 1(0,1) Continuation of MUSIC 354. May be repeated on other performance media with departmental approval. Jury is required. Applied music fee is assessed. *Preq:* MUSIC 354, consent of instructor.

MUSIC 454 Applied Music for Majors 1(0,1) Continuation of MUSIC 453. May be repeated on other performance media with departmental approval. Jury and a full recital performance are required. Applied music fee is assessed. *Preq:* MUSIC 453, consent of instructor.

MUSIC 480, 680 Advanced Music Technology 3(2,2) Exploration of MIDI (Musical Instrument Digital Interface) through music notation and sequencing. Students have hands-on experience producing printed scores and sequences on the computer and selected software. *Preq:* MUSIC 205 or consent of instructor.

MUSIC 499, 699 Independent Studies 1-3(1-3,0) Tutorial work for students with special interests in music study outside the scope of existing courses. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

[1]This course may be repeated for credit with a maximum of 16 hours of ensemble credit allowable toward a degree.

NONPROFIT LEADERSHIP

NPL 300 Foundations in Nonprofit Leadership 2(2,0) Students develop an understanding of historical and philosophical aspects of nonprofit organizations, as well as special skills needed to develop boards, recruit volunteers, raise funds, and manage day-to-day operations. Career development opportunities are also explored.

NURSING

Professors: E. J. Lee, B. N. Logan, *Director;* S. M. Oldaker, R. H. Pruitt, P. A. Smart; *Associate Professors:* B. J. Holder, N. K. Meehan, V. G. Parker, A. B. Privette, S. W. Thompson, J. L. Timms, S. D. M. Van Sell; *Assistant Professors:* C. L. Belcher, R. L. Carr, J. A. Eggert, L. M. Gibson, L. A. Howe, A. J. Hunter, C. W. Lee, M. P. Miller, M. J. Thorson, M. A. Wetsel, D. F. Willoughby; *Lecturers:* M. J. Arnold, P. A. Botchway, L. Crew, J. S. Gillespie, K. P. Hardin, E. N. Hatfield, E. R. Hearn, E. F. Macfie, G. A. Rochester, E. Swanson, J. E. Ward

NURS 140 Computer Applications in Health Care 3(3,0) [C.3] Introduction to the application of computers in the delivery of health care. Covers existing health-care applications and forecasts future needs. Multiple computer systems are discussed. Nursing majors will be given enrollment priority.

NURS 300 Seminar in Health Care Topics 1-4 (1-4,0-9) Individualized in-depth study in a selected health-care area; may have a clinical component and/or special projects. Open to non-Nursing majors. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

NURS 303 Nursing of Adults 7(3,8) Incorporates theoretical and empirical knowledge from physical and social sciences. Uses critical thinking to provide holistic, safe, individualized nursing care to adults, including health promotion, maintenance, restoration, and health teaching. *Preq:* NURS 304, 310, 312, 340. *Preq or Coreq:* NURS 320.

NURS 304 Pathophysiology for Health-Care Professionals 3(3,0) Focuses on disease mechanisms and recognition of the manifestations of these mechanisms in body systems. Discussion also includes pharmacologic and mechanical interventions commonly associated with specific disease processes and application to patient-care situations. *Preq:* BIOSC 223, consent of instructor.

NURS 305 Psychosocial Nursing 3(3,0) Lifespan approach to examine psychosocial, developmental, family, and cultural factors that influence individuals from diverse populations and their families in the promotion, maintenance, and restoration of health. The use of the nursing process, critical thinking, therapeutic communication, and psychosocial nursing interventions is explored. *Preq:* Junior standing in Nursing.

NURS 307 Family Nursing in the Community 5(4,2) Bridge course for RN students focusing on nursing care of families including childbearing clients, infants, children, adolescents, adults, and older adults in the context of the community. Emphasis is on strategies to assist individuals in achieving or maintaining wellness in the family, home, and community environment. *Preq or Coreq:* NURS 304, 313.

NURS 310 Health Assessment 3(2,2) Introduces concepts of health, wellness, and illness. Focuses on physical, psychosocial, and cultural assessment for the well adult client with variations across the lifespan. Includes interviewing techniques. *Preq:* All required non-nursing courses and electives.

NURS 311 Introduction to Community Nursing 2(2,0) Focuses on health promotion and illness prevention activities across the lifespan for individuals and families in the community. Major emphasis is on nursing's role in the acquisition and maintenance of health as well as the identification and modification of health risk factors. *Preq:* NURS 310, 312, 320. *Preq or Coreq:* NURS 304, 340.

NURS 312 Therapeutic Nursing Interventions 4(2,4) Focus on therapeutic nursing interventions, including selected psychomotor skills, communication skills, and teaching/learning. *Preq:* All required non-nursing courses and electives.

NURS 313 Health Assessment Through the Lifespan 4(3,2) Expands on RNs' knowledge of health assessment. Focuses on physical and psychosocial assessment for the well client throughout the lifespan. Interviewing techniques are included.

NURS 320, H320 Professionalism in Nursing 2(2,0) [W.1] Application of critical thinking skills in the professional nursing roles in multidisciplinary approaches to health care. Analysis of the historical development of modern nursing. Examination of issues of nursing care to diverse populations within context of ethical and professional standards. *Preq:* All required non-nursing courses and electives.

NURS 323 Gerontology Nursing 2(2,0) Introduction of theories of aging. Focuses on complex health care issues of aging and chronic care including promotion, maintenance, and restoration of health of the elderly. Scientific concepts address physiological, psychological, and sociological issues of aging and chronic illness. *Preq:* NURS 310, 312, 320, PSYCH 201, SOC 201. *Preq or Coreq:* NURS 304, 340.

NURS 330, H330 Research in Nursing 3(3,0) [W.1] Introduction to conceptual frameworks, models, and theories related to nursing. Analysis of reported research in nursing and related disciplines. Ethical, moral, and legal issues are discussed in relation to nursing research. *Preq:* NURS 310, 312, 320. *Preq or Coreq:* NURS 304, 340.

NURS 340 Pharmacotherapeutic Nursing Interventions 3(3,0) Focuses on the integration of nursing process with pharmacotherapeutics, administration, monitoring, and related client education. Includes major drug classifications, indications for use, side effects, interactions, routes of administration, usual dosages and contraindications. *Preq:* All required non-nursing courses and electives.

NURS (PHIL) 350 Technology and Philosophy in Nursing 3(3,0) Analysis of the influence of the increasing application of scientific technology to health-care delivery and concomitant ethical issues.

NURS 401 Mental Health Nursing 5(3,4) Application of theories and the nursing process to identify, implement, and evaluate nursing interventions for the care of clients with psychiatric disorders. *Preq:* All required 300-level nursing courses.

NURS 403 Complex Nursing of Adults 5(3,4) Focus on the biological, psychological, philosophical, and socio-cultural influences on complex health problems related to acute and traumatic conditions. Emphasis is on the concepts of circulation, oxygenation, homeostasis, and compensation in acutely ill adults. *Preq:* NURS 401, 411, 412.

NURS 405, H405 Leadership and Management in Nursing 3(2,2) [W.1] Focuses on the role of the professional nurse in managing nursing care. Theories and research related to leadership, power, management, organizations, regulation, and ethics are discussed. Directed laboratory experiences are provided. *Preq:* NURS 401, 411, 412.

NURS 406 Issues in Professionalism 3(3,0) [W.1] Analysis of the development of professional nursing. Consideration of educational issues, legal and economic issues, health policy, leadership, cultural variations, and the influence of values in ethical decisions and nursing practice. *Preq:* Admission to RN BS program.

NURS 408 Senior Nursing Practicum 3(1,4) Impact of selected health issues and problems on the practice of nursing is considered. Licensure preparation, techniques to maintain currency in the field, and other relevant topics facing the professional nurse are presented. Under preceptor supervision, students observe, organize, and implement entry level nursing practice. To be taken Pass/Fail only. *Preq:* NURS 401, 411, 412.

NURS 411 Nursing Care of Children 5(3,4) Focuses on child health problems and health maintenance. Emphasis is on biological, pathophysiological, psychological, and socio-cultural concepts related to nursing care of children with acute, critical, and chronic illnesses. Includes strategies for alleviation of illness, restoration of wellness, promotion and maintenance of health, growth and development. *Preq:* NURS 303, 305, 311, 323, 330.

NURS 412 Nursing Care of Women and Their Families 5(3,4) Emphasis is on biological, psychological, and socio-cultural concepts. Identification of appropriate nursing strategies that enhance individual capacity to achieve or maintain wellness in the family, home, community, and hospital environment. *Preq:* NURS 303, 305, 311, 323, 330.

NURS 415 Community Health Nursing 4(2,4) Consideration of health promotion activities for family and community groups with emphasis on community assessment, screening and health teaching/counseling. Practice activities are related to health promotion in population groups and nursing care of homebound clients. Laboratory settings include homes, schools, industries, and other community organizations. *Preq:* NURS 401, 411, 412.

NURS H420 Senior Honors I 2(2,0) Students develop a proposal for a major thesis, direct study project, or research project under the guidance of a faculty preceptor. *Preq:* Senior Honors standing, NURS H330.

NURS H428 Senior Honors II 2(2,0) Students implement a proposal for a major directed study project or research thesis under the guidance of a faculty preceptor. *Preq:* Senior Honors standing, NURS H405, H420.

NURS 485 Nurse Extern Practicum 6(0,18) Practicum consisting of preceptor-supervised and faculty-led nursing clinical experiences in a regional health-care facility. *Preq:* Completion of at least one adult health and one pathophysiology course or consent of instructor.

NURS 499 Independent Study 1-4(1-4,0-9) In-depth study in an area of special interest in Nursing. Students devleop specific objectives with a faculty member with expertise in the area of interest May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

NUTRITION

(See also courses listed under Animal and Veterinary Sciences, Biochemistry, and Food Science.)

Professors: J. A. Bertrand, A. B. Bodine II, D. L. Cross, T. C. Jenkins, M. E. Kunkel, D. V. Maurice; *Assistant Professor:* V. J. Haley-Zitlin; *Instructor:* R. M. Haliena

NUTR 203 Principles of Human Nutrition 3(3,0) Principles of nutrition including functions, digestion, and requirements of nutrients; factors affecting food choices and dietary adequacy; and roles of nutrition in physical fitness and health maintenance. May not be substituted for NUTR 401.

NUTR 210 Nutrition and Physical Activity 3(3,0) Topics include role of carbohydrates, fats, and proteins on energy utilization during exercise; altering body composition and improving fitness with diet and physical activity; importance of fluid intake on performance; effectiveness of dietary supplements and ergogenic aids; and choosing a diet appropriate for individual physical activity levels. *Preq:* BIOL 102 or equivalent.

NUTR 211 Nutrition Throughout the Life Cycle 3(3,0) Topics include nutrition needs during pregnancy, infancy, childhood, adulthood, and aging; diet selection appropriate for each of those stages; and controversies concerning dietary effects on heart disease, cancer, immune system function, and weight control. *Preq:* BIOL 102 or equivalent.

NUTR 401, H401, 601 Fundamentals of Nutrition 3(3,0)F Biochemical and physiological fundamentals of nutrition applicable to domestic animals and man. Digestive processes and absorption and metabolism of carbohydrates, lipids, proteins, water, minerals, and vitamins are considered. Energy metabolism and comparative anatomy and physiology of digestive systems are discussed. *Preq:* BIOCH 210, CH 223, or consent of instructor.

NUTR 420 Selected Topics in Nutrition 1-3(1-3,0) Comprehensive study of special topics in nutrition not covered in detail or contained in other courses. Current developments in each area are stressed. May be repeated for a maximum of three credits, but only if different topics are covered. *Preq:* Senior standing or consent of instructor.

NUTR 421 Special Problems in Nutrition 1-4 (0,3-12) Independent research investigation in nutrition. Special emphasis is on developing a research proposal, conducting the research, and reporting the findings. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Senior standing or consent of the instructor.

NUTR 425, H425, 625 Nutrition and Dietetics 4(3,3) Development of diets to meet human nutritional needs with emphasis on metabolic bases of dietary management of individuals with various disease states. *Preq:* NUTR 451 or equivalent.

NUTR 426, 626 Community Nutrition 3(3,0) Study of fundamentals of nutrition care delivery in community programs beginning with assessment and problem identification and continuing through the development, implementation, and evaluation of nutrition intervention programs. *Preq:* NUTR 451 or equivalent or consent of instructor.

NUTR 451, H451, 651 Human Nutrition 3(3,0) Essentials of nutrition and principle nutritional deficiency conditions. Factors affecting adequacy of dietary intake, methods of determining nutritional status, development of nutrition standards, and recent advances in human nutrition. *Preq:* BIOCH 210/211 or equivalent or consent of instructor.

NUTR 455, 655 Nutrition and Metabolism 3(3,0) Concepts of metabolism fundamental to understanding normal and therapeutic nutrition are examined. Bioenergetics as well as metabolism of carbohydrates, lipids, amino acids, vitamins, and minerals as they relate to nutrition are discussed. *Preq:* NUTR 451 and BIOCH 210 or 423 or 406 or consent of instructor.

PACKAGING SCIENCE

Professors: R. L. Thomas, *Chair;* P. J. Vergano; *Associate Professors:* D. K. Cooksey, R. M. Kimmel, W. S. Whiteside; *Assistant Professor:* T. G. Weigel; *Lecturer:* L. H. Doar, Jr.; *Adjunct Professor:* C. R. Barmore; *Adjunct Associate Professors:* D. H. Johns, H. J. Park; *Adjunct Instructor:* R. R. Perdue

PKGSC 101 Packaging Orientation 1(1,0) Overview of the various principles and practices in packaging science, historical development, packaging as a career.

PKGSC 102 Introduction to Packaging Science 2(2,0) Functions of a package; materials, processes, and technology used in package development; the relationship of packaging to the corporation, consumer, and society as a whole. *Preq:* PKGSC 101 or consent of instructor.

PKGSC 202 Packaging Materials and Manufacturing 3(3,0) Detailed study of packaging materials including glass, metal, metal foils and sheets, wood, paper, paperboard, plastics, composites, adhesives, coatings, cushioning media; their functional properties in packaging application; laminating and combining of different packaging materials. *Preq:* PKGSC 102 or consent of instructor.

PKGSC 204 Container Systems (Rigid and Flexible) 3(3,0) Examination of all the packages and containers used to develop systems to distribute products. Compatibility of product and package, structural design, costs, and merchandising considerations are stressed. *Preq:* PKGSC 202, 206 (or concurrent enrollment) or consent of instructor.

PKGSC 206 Container Systems Laboratory 1(0,3) Laboratory practice in sample making, designing and constructing various containers. *Preq:* PKGSC 204 (or concurrent enrollment).

PKGSC 316 Application of Polymers in Packaging 3(2,3) Detailed study of polymer chemistry and polymerization technology. Emphasis is on polymers which are significant in packaging. Study includes polymer morphology, rheology, physical properties, and processing methods. *Preq:* PKGSC 204; CH 201 or 223; or consent of instructor.

PKGSC 368, H368 Packaging and Society 3(3,0) Study of the role of packaging in modern-day society. Responsibilities of the packager to protect people and the environment. Package guidelines recommended by civilian and governmental agencies. *Preq:* PKGSC 102 or consent of instructor.

PKGSC 401, 601 Packaging Machinery 3(3,0) Systematic study of machinery used to form, fill, seal, laminate, combine, and print continuous and automated packaging lines and auxiliary material handling equipment, including principles of machine design, operation, selection, and specification. *Preq:* PKGSC 204, PHYS 207 or consent of instructor.

PKGSC 404, H404, 604 Mechanical Properties of Packages and Principles of Package Evaluation 3(3,0) Study of the mechanical properties of packages, principles and standard methods (ASTM, TAPPI) of determining these properties. Evaluation of functional properties of packages including shock and vibration isolation. *Preq:* PHYS 207, PKGSC 204, or consent of instructor.

PKGSC (FD SC) 409 Total Quality Management for the Food and Packaging Industries 3(3,0) See FD SC 409.

PKGSC 420, 620 Package Design and Development 3(3,0) Relationship between packaging and the marketing of consumer goods. Study of the various principles and methods practiced in developing packages, methods used to coordinate package development activities including interfacing with product development, manufacturing, marketing, and purchasing. *Preq:* PHYS 207, PKGSC 404, or consent of instructor.

PKGSC 421 Special Problems in Packaging Science 1-4(0,3-12) Independent research investigations in packaging science related to packaging materials, machinery, design, and applications. Special emphasis is placed on organizing a research proposal, conducting research, and reporting results. May be repeated for a maximum of 15 credits. *Preq:* Consent of instructor.

PKGSC 422 Selected Topics in Packaging Science 1-3(1-3,0) Comprehensive study of selected topics in packaging science not covered in detail or contained in other courses. Contemporary developments in each topic area are stressed. May be repeated for a maximum of 15 credits, but only if different topics are covered. *Preq:* Consent of instructor.

PKGSC 440, 640 Packaging for Distribution 3(3,0) Delivery of a packaged product from point of manufacture to point of sale often involves several shipping methods, e.g., truck, rail, air, or ship. To assure both product protection and lowest cost, students must be familiar with the fundamentals of distribution packaging technology. *Preq:* Senior standing, consent of instructor.

PKGSC 454, 654 Package Evaluation Laboratory 2(0,6) Laboratory experiments to determine properties of packaging materials and to evaluate the performance of packages including shipping tests (shock and vibration). Students learn how to operate standard testing apparatus and become familiar with industry-recognized test methods and standards. *Preq:* PKGSC 404 or consent of instructor.

PKGSC 464, H464, 664 Food Packaging Systems 3(3,0) Characteristics and application of various materials and systems used in the packaging of foods. Engineering properties of the materials and methods used to measure properties are emphasized. Consideration is given to packaging systems for specific food applications. *Preq:* Consent of instructor.

PKGSC 466, 666 Food Packaging Systems Laboratory 1(0,3) Laboratory and field exercises on food packaging operations and packaging materials. Methods to evaluate the physical and chemical properties of packaging materials are emphasized. *Preq:* Consent of instructor.

PARKS, RECREATION, AND TOURISM MANAGEMENT

Professors: L. R. Allen, S. J. Backman, R. H. Becker, G. W. Burnett, L. W. Gahan, W. E. Hammitt, G. E. Howard, A. E. James, F. A. McGuire, R.W. McLellan, *Chair;* J. R. Pope, Jr.; *Associate Professors:* H. J. Grove, J. M. McDonald, M. K. McLellan, T. D. Potts, C. R. White, Jr.; *Assistant Professors:* K. F. Backman, R. D. Bixler, W. C. Norman; *Lecturer:* B. W. Stevens

PRTM 101 Concepts of Leisure 3(3,0) Introduces recreation professions and organizations: government, voluntary, and commercial. Overviews professional preparation. Outlines development of man's uses of leisure and evolution of recreation, city parks, natural resources conservation, and preservation movements as philosophical forces affecting leisure services.

PRTM 104 Recreation Services Delivery Systems 3(3,0) Students are introduced to the major delivery systems of Parks, Recreation, and Tourism Management. The philosophy, clientele, current issues, and career opportunities within these areas are studied. Enrollment is limited to Parks, Recreation, and Tourism Management majors.

PRTM 201, H201 The Recreation/Leisure Environment 3(3,0) Discusses the development characteristics of built and natural environmental resource settings for recreation, tourism development, and community expression. Examines human/environment interactions during leisure, including the impact of the recreation environment on people and the impact of people on the recreation environment. Surveys public agencies and private interests in these settings.

PRTM 203 Personal and Community Health 3(3,0) Deals with health problems, disease prevention and control, school health practices, public health administration, and other health information which may enable one to live intelligently in today's complex society.

PRTM 205 Program and Event Planning 3(2,3) Principles and methods of program development. Time and facility utilization for sports activities, social functions, arts and crafts, outdoor activities, hobbies or special-interest groups, and activities in the cultural and performing arts are pursued. *Preq:* PRTM 101.

PRTM 206 Practicum I 1(0,3) Students conduct a recreation program in a supervised setting. A minimum of 90 hours with a leisure agency approved by the University is required. To be taken Pass/Fail only. *Preq:* PRTM 205, Sophomore standing in Parks, Recreation, and Tourism Management.

PRTM 207 Practicum II 1(0,3) Continuation of PRTM 206. Experience in a leisure situation different from the PRTM 206 exposure. A minimum of 90 hours with a leisure agency approved by the University is required. To be taken Pass/Fail only. *Preq:* PRTM 205, Sophomore standing in Parks, Recreation, and Tourism Management.

PRTM (FOR) 209 Professional Application of Microcomputers 3(1,4) [C.3] Basic competencies in and professional applications of the following areas are realized: GUI, word processing, databases, spreadsheets, graphics, and electronic communication. Legal and ethical issues of computer use and information access and exchange are also presented. Majors in Parks, Recreation, and Tourism Management or Forest Resources will be given enrollment priority.

PRTM 254 Introduction to Sport Management 3(3,0) Development of a conceptual understanding of sport management, career opportunities in sport management, and the necessary competencies for the different career fields.

PRTM 270, H270 Introduction to Recreation Resources Management 3(3,0) Fundamentals of recreation resources management are presented to include the framework of management, management of specific resources, management of visitors, and management of services.

PRTM 301 Recreation and Society 3(3,0) Investigation of the role of recreation in a technological and work-oriented society. Particular emphasis is on recreation behavior, resources, and programming in public and private organizations which serve the public wants. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 305 Safety and Risk Management in Parks, Recreation, and Tourism Management 3(3,0) Provisions of safe services, facilities, and activities in the parks, recreation, and tourism domain are studied through the application of germane concepts from the areas of safety, risk management, and liability. *Preq:* Junior standing, 2.0 cumulative grade-point ratio.

PRTM 307 Facility Operations and Maintenance 3(2,3) Maintenance techniques and materials. Job planning and scheduling problems of overuse and preventive maintenance are included. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 308, H308 Leadership and Group Processes in Recreation 3(3,0) Leadership is analyzed through experience-based learning. Various styles of leadership and communication and their probable consequences are examined. Techniques for planning large and small group meetings are considered. Examination is made of literature in the field of leadership and group processes. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 309 Behavioral Concepts in Parks, Recreation, and Tourism 3(3,0) Studies social psychological concepts concerning leisure behavior in various park, recreation, and tourism settings. Students learn to apply those theories and behavioral concepts required to understand and manage leisure activities and environments. *Preq:* PRTM 101; PSYCH 201 or SOC 201; 2.0 cumulative grade-point ratio; consent of instructor.

PRTM 311, H311 Therapeutic Recreation 3(3,0) Examination of the profession of therapeutic recreation by analyzing the history, philosophy, concepts, roles, and functions involved in the therapeutic recreation services. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 314 Therapeutic Recreation Interventions I 1(0,3) Experiential examination of program interventions used with mental health, chemically dependent, and related populations. *Preq:* PRTM 101, 2.0 cumulative grade-point ratio.

PRTM 315 Therapeutic Recreation Interventions II 1(0,3) Experiential examination of program interventions used with physically disabled and other populations. *Preq:* PRTM 314, 2.0 cumulative grade-point ratio.

PRTM 316 Therapeutic Recreation Processes 3(3,0) Examination of principles and procedures applicable to client assessment, activity analysis, goal identification, treatment planning, documentation, and evaluation in therapeutic recreation. *Preq:* PRTM 311, 2.0 cumulative grade-point ratio.

PRTM 318 Leisure Lifestyle Management 3(3,0) Examines principles and techniques applicable to guiding disabled as well as nondisabled individuals in an exploration of leisure needs, barriers, consequences, and accessibility. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 320, H320 Recreation Policymaking 3(3,0) Structures and processes for public park and/or recreation policy formation in the United States. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 321, H321 Recreation Administration 3(3,0) Analysis of the internal organization of a recreation department dealing with finances and accounting, records and reports, publicity and public relations, state and federal legislation, staff organization, coordination of community resources. *Preq:* Junior standing, 2.0 cumulative grade-point ratio.

PRTM 330, H330 Visitor Services and Interpretation 3(3,0) Introduction to the philosophy and principles of the art of environmental interpretation. Comprehensive survey of interpretive theory as it applies to the recreation and parks practitioner and the varying settings within the profession. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 342, H342 Introduction to Tourism 3(3,0) Survey of travel and tourism in the United States with focus on terminology, demographics, financial significance, and trends. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 343 Spatial Aspects of Tourist Behavior 3(3,0) Spatial patterns of national and international leisure travel destinations are explored and analyzed regarding their tourism attractiveness. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 344 Tourism Markets and Supply 3(3,0) Acquaints students with the principles of matching tourism markets and supply. Students examine the strategies used in developing markets. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 349 Survey of Tourism Sites 1(0,3) On-site study of various exemplary components of the travel and tourism industry in the Southeast. There are additional costs to students to cover travel. To be taken Pass/Fail only. *Preq:* PRTM 342, Junior standing in Parks, Recreation, and Tourism Management, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 352 Camp Organization and Administration 3(2,3) Surveys the development and trends of camping in America. Considers programming for the operations of agency and private camps. Enables students to master the techniques of group living. Laboratory offers practical experience in camp craft including trips and outdoor cooking. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 390 Independent Study in Parks, Recreation, and Tourism Management 1-3(1-3,0) Comprehensive studies and investigation of special topics not covered in other courses. Emphasis is on field studies, community service, and independent readings. May be repeated for a maximum of three credits. *Preq:* Junior standing, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 391 Selected Topics in Parks, Recreation, and Tourism Management 2-3(2-3,0) In-depth examination of developing trends in parks, recreation, and tourism that warrant timely study. May be repeated twice for a maximum of six credits, but only if different topics are covered. *Preq:* Junior standing, 2.0 cumulative grade-point ratio.

PRTM 400, 600 Supervision of Recreation Personnel Patterns and Processes 3(3,0) Comprehensive study of supervisory process in relation to individuals, programs, and groups in recreation agencies. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 403 Elements of Recreation and Park Planning 3(3,0) Basic recreation and park planning principles, processes, and trends in area and facility development combine to form the basis for formulation of a relevant knowledge of planning. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 404 Field Training I 1(1,0) Preparation for field training experience including topics such as résumé development, interviewing techniques, internship agency selections, and responsibilities of the student, department, and agency. To be taken Pass/Fail only. *Preq:* PRTM 206, 207 (or concurrent enrollment), 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 405 Field Training II 6(0,18) Minimum ten weeks (400 hours) of uninterrupted, supervised work in a park, recreation, or tourism management agency. Under agency supervision, students observe, organize, and implement activities, events, and programs. To be taken Pass/Fail only. *Preq:* PRTM 206, 207, 404; Senior standing in Parks, Recreation, and Tourism Management; 2.0 cumulative grade-point ratio; consent of instructor.

PRTM 406 Senior Seminar 1(1,0) Examination of current community recreation, resource management, therapeutic recreation, and tourism management topics that allows senior Parks, Recreation, and Tourism Management students the opportunity to relate academic studies to the latest problems, changes, and trends in the field. *Preq:* Senior standing in Parks, Recreation, and Tourism Management; 2.0 cumulative grade-point ratio.

PRTM 409 Methods of Recreation Research I 3(3,0) Analysis of the principal methods of recreation research, the application of descriptive statistics to recreation research, and the development of a research proposal. *Preq:* Senior standing in Parks, Recreation, and Tourism Management; 2.0 cumulative grade-point ratio.

PRTM 410, H410 Methods of Recreation Research II 3(3,0) Continuation of PRTM 409; includes supervised execution and reporting of results of research proposal developed in PRTM 409 and the application of inferential statistics to research. *Preq:* PRTM 409, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 411, H411, 611 Therapeutic Recreation for Selected Populations 3(2,3) Therapeutic recreation services for the developmentally disabled person and youth and adult corrections populations. Emphasis is directed to the planning and implementation of therapeutic recreation services to the needs of clients and the goals of agencies and institutions.

PRTM 412, H412, 612 Therapeutic Recreation and Mental Health 3(3,0) Therapeutic recreation services in mental health clinics, institutions, and outdoor settings. Review of disorders and current modes of treatment as they relate to therapeutic recreation. *Preq:* PRTM 311, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 413, 613 Recreation Therapy in Physical Rehabilitation 3(3,0) Examination of the potential psychological, physical, and sociological implications of disability to the individual and to the planning and directing of therapeutic recreation services. *Preq:* PRTM 311, three credit hours of human anatomy and physiology, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM (ED SP) 414, 614 Recreation and Leisure for Special Populations 3(3,0) Provides class participants with practical experience in designing recreation and leisure activities for special populations (e.g., handicapped, elderly). *Preq:* 2.0 cumulative grade-point ratio.

PRTM (ED F) 415, 615 Methods in Reducing Risks for Middie Childhood 3(2,3) See ED F 415.

PRTM 416 Leisure and Aging 3(3,0) Examines the role of leisure services in later life, the needs of community-based and institutionalized elderly, and the development of service-delivery systems to meet those needs. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 421, H421, 621 Recreation Financial Resources Management 3(3,0) Analysis of recreation financial resources management. Deals with revenue sources and their allocation. *Preq:* PRTM 321, Senior standing in Parks, Recreation, and Tourism Management; 2.0 cumulative grade-point ratio.

PRTM (GEOG) 430, 630 World Geography of Parks and Equivalent Reserves 3(3,0) Major international patterns in the provision and use of urban and rural parks and recreation are examined. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 431, 631 Methods of Environmental Interpretation 3(2,3) Practice and instruction in the use of equipment and methods available to the interpreter in public contact work. Coaching in presentation and evaluation of live programs and in design, execution, and evaluation of mediated programs is the major emphasis. Programs are delivered to public audiences in the Clemson area. *Preq:* PRTM 330; Senior standing in Parks, Recreation, and Tourism Management; 2.0 cumulative grade-point ratio; consent of instructor.

PRTM 441, 641 Commercial Recreation 3(3,0) Components of offering leisure services and products to the public by individuals, partnerships, and corporations for the purpose of making a profit. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 443, 643 Resorts in National and International Tourism 3(3,0) A variety of resort types are studied with respect to their development, organization, visitor characteristics, and environmental consequences. A case-study approach is used. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 444, 644 Tour Planning and Operations 3(3,0) Provides the opportunity to understand the psychology of touring, with emphasis on packaged and group tours and how tours of different types and scale are planned, organized, marketed, and operated. *Preq:* PRTM 342, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 445, 645 Conference/Convention Planning and Management 3(3,0) Provides the opportunity to understand the problems of and solutions to conference and convention planning and management from both the sponsoring organization's and facility manager's perspectives. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 446, 646 Community Tourism Development 3(3,0) Provides a community-based perspective of organizational, planning, development, and operational needs for a successful tourism economy at the local level. *Preq:* PRTM 342, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 447, 647 Perspectives on International Travel 3(3,0) Using the United States as a destination, international travel patterns and major attractions are presented. Factors which restrain foreign travel to the United States are analyzed. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 452, 652 Campus Recreation 3(3,0) Study of the basic components required for administration of successful college union and intramural-recreation sport programs. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 453 Sports Information and Event Management 3(3,0) Introduction to basic techniques, tools, and procedures associated with sports information and event management activities. Focuses on the application of sports information and event management activities building upon knowledge from personal interviews, selected readings, event management brochures and field experience. *Preq:* PRTM 254, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 454 Trends in Sport Management 3(3,0) Examination of trends in the sport management area that allows PRTM majors to obtain an updated knowledge base of the field. Students are able to relate their academic studies to the current trends, problems, and management strategies confronting and being used within the sport management industry. *Preq:* PRTM 254, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 472, 672 Historic Site Interpretation 3(3,0) Development and implementation of the specialized interpretive programs required at historic sites. An overview of the historic movement in the United States and its presentation to the American people. *Preq:* PRTM 330, 2.0 cumulative grade-point ratio.

PRTM 474, H474 Advanced Recreation Resources Management 3(3,0) Advanced topics in recreation resource management focusing on management strategies and techniques for addressing common resource and social problems in recreation resource management. Case studies and problem analysis are emphasized. *Preq:* Senior standing, 2.0 cumulative grade-point ratio.

PRTM 483 Golf Club Management and Operations 3(0,9) Focuses on activities related to merchandising, purchasing and selling, inventory management, vendor selection, pricing strategies, strategies for monitoring sales and inventory related to financial control and customer service. Students are exposed to the responsibilities of a golf professional at a full-service golf club facility. *Preq:* Concurrent enrollment CO-OP 104, 105.

PRTM 490 SR Independent Study 1-3(1-3,0) In cooperation with and under supervision of a faculty member, students develop and execute a field study or community project. May be repeated twice for a maximum of three credits. *Preq:* Senior standing in Parks, Recreation, and Tourism Management or consent of instructor.

PERFORMING ARTS

Professors: C. S. M. Egan, R. E. Goodstein, *Chair*; L. U. Harder, D. R. Rash, R. C. Sawyer; *Associate Professors:* D. J. Hartmann, N. M. Hosler, A. R. Levin; *Assistant Professors:* P. L. Buyer, H. Currie, L. L. Li-Bleuel, V. M. Vactor; *Instructor:* S. C. Lehmkuhl; *Lecturers:* L. Dzuris, J. L. Franzese

P A 101 Introduction to Performing Arts 3(2,3) Overview of performing arts including performance, careers, technology, production, management, community outreach, safety, sales, and marketing. *Preq:* Performing Arts major.

P A 201 Performing Arts Seminar I 1(0,3) Study of selected performing arts topics. Includes seminars and masterclasses with faculty and visiting artists and concert and theatre attendance and evaluation. Emphasis is placed on written communication skills. *Preq:* P A 101.

P A 279 Performing Arts Laboratory 1(0,3) Practical work on performing arts presentations including backstage technical work, multimedia support, and arts management. *Preq:* P A 101.

P A 301 Performing Arts Seminar II 1(0,3) Continuation of P A 201 with added focus on critical and ethical analysis of performing arts. Emphasis is placed on oral communication skills. *Preq:* P A 201.

P A 401 Senior Project Research 1(0,3) Performing Arts students research a substantial project for the community. Interdisciplinary performing arts group generates a proposal for P A 402. May be repeated for a maximum of two credits. *Preq:* P A 301.

P A 402 Senior Project 3(0,9) Capstone course for Performing Arts majors. Preparation, execution, and assessment of a substantial group performing arts project for the community. Students, with faculty guidance, manage all aspects of the project. *Preq:* Minimum grade of *B* in P A 401, Senior standing.

PHILOSOPHY

Professors: W. A. Maker, *Chair*; T. G. May, S. Silvers; *Associate Professors:* M. A. Martin, T. J. Oberdan, S. A. Satris, D. E. Wueste; *Assistant Professor:* K. C. Smith; *Lecturers:* J. M. Culler, D. L. Stegall, W. S. Watson

PHIL 101, H101 Introduction to Philosophic Problems 3(3,0) Discussion of representative philosophical questions which arise from human thought and action. Characteristic topics are values, knowledge, human nature, and society.

PHIL 102, H102 Introduction to Logic 3(3,0) Introduction to methods of evaluating arguments. Simple valid argument forms are given which can be joined together to produce the logical form of virtually any argument. Informal fallacies may also be considered.

PHIL 103, H103 Introduction to Ethics 3(3,0) Philosophical consideration of the nature of ethics, basic ethical issues, and problems and modes of ethical reasoning.

PHIL 105 Introductory Seminar in the Big Questions 3(3,0) Introductory seminar dealing with a single important philosophical question ("Who are we?" "What is the meaning of life?" "Are we free or determined?" etc.). Question is pursued throughout the semester with active student involvement. Questions may vary from semester to semester.

PHIL 201 Responsibilities in Leadership 3(3,0) Exploration of the responsibilities leaders have to those who are being led, to those on whose behalf they are leading, to those affected by leadership decisions and actions. Focuses on the relationship between responsibility and authority and the role of judgment in the exercise of leadership.

PHIL 225 Art and Logic of Scientific Reasoning 3(3,0) Examines applications and misapplications of inductive reasoning and causal inference in scientific explanation and everyday discourse. Topics include correlation and confirmation, natural laws, natural kinds, scientific explanation, causal inference and experimental methods.

PHIL 303 Philosophy of Religion 3(3,0) Critical consideration of the meaning and justification of religious beliefs. Representative topics are the nature and existence of God, religious knowledge, religious language, the problem of evil.

PHIL 304 Moral Philosophy 3(3,0) Study of moral problems, their origin in conflicts between duty and desire, and alternative solutions proposed by classical and contemporary writers.

PHIL (CHIN) 312 Philosophy in Ancient China 3(3,0) Study of the history of Chinese philosophy from fifth century B.C.E., including Confucianism, Daoism, Moism, legalism, Buddhism, Neo-Daoism, and Neo-Confucianism. Examination of Chinese philosophers' views and arguments on questions of life and death, history and society, education and personal cultivation. May not be used to satisfy general foreign language requirements.

PHIL (CHIN) 313 Philosophy in Modern China 3(3,0) Study of the history of Chinese philosophy from the 19th century to the present including Neo-Confucianism, Conservatism, Liberalism, Nationalism, and Chinese Marxism. Examination of the conflict and fate of traditional and modern values in China. All readings and discussions are in English. May not be used to satisfy general foreign language requirements.

PHIL 315 Ancient Philosophy 3(3,0) Origins and development of rationality as found in the thought of selected philosophers such as Socrates, Plato, and Aristotle.

PHIL 316 Modern Philosophy 3(3,0) Development of the modern view as seen in major Western philosophers of the 16th, 17th, and 18th centuries. Thought of Descartes, Spinoza, Leibniz, Locke, Berkeley, and Hume may be considered to illustrate the development of rationalism and empiricism.

PHIL 317 Nineteenth-Century Philosophy 3(3,0) Development of 19th-century philosophy with emphasis on selected works of philosophers such as Kant, Hegel, Marx, Nietzsche, and Kierkegaard.

PHIL 318 Twentieth-Century Philosophy 3(3,0) Study of the dominant movements in Western philosophy today, particularly existentialism and analytical philosophy. The object is to acquire sufficient background for reading current philosophical or philosophically-influenced literature.

PHIL 320 Social and Political Philosophy 3(3,0) Critical consideration of the views of some major philosophers on the nature of the individual's relation to society and the state in the context of their wider philosophical (logical, epistemological, metaphysical, and ethical) doctrines. Philosophers may include Plato, Aristotle, Augustine, Hobbes, Rousseau, Mill, Marx, Hegel, Rawls, and Nozick.

PHIL 321 Crime and Punishment 3(3,0) Investigates what sorts of conduct should be criminalized and what society should do with those who engage in criminal activity. Specific topics may include the enforcement of morals, euthanasia, hate crimes, deterrence, retribution, and restitution.

PHIL 323 Theory of Knowledge 3(3,0) Examination of concepts, criteria, and decision procedures underlying rational belief and the justification of knowledge claims. Representative answers to the problem of skepticism are considered, with special attention to some leading theories of knowledge.

PHIL 324 Philosophy of Technology 3(3,0) Examines technology and representative philosophical assessments of it with a focus on understanding its impact on the human condition.

PHIL 325 Philosophy of Science 3(3,0) Philosophical study of problems generated by science, but which are not themselves scientific, such as what comprises a scientific theory; how scientists formulate theories and acquire knowledge; what, if anything, differentiates science from other ways of knowing; what role concepts play in scientific knowledge; and whether scientific progress is rational.

PHIL 326 Science and Values 3(3,0) Examination of several features of the relation between science and values. Topics may include ethical and social obligations of scientists, role of value judgements in scientific practice, and influence of social and political values on science and scientists.

PHIL 327 Philosophy of Social Science 3(3,0) Inquiry into the philosophical foundations of social science, in particular questions of objectivity, explanatory structure, causality, agency, normativism and naturalism, and social determination of knowledge.

PHIL 330 Contemporary Issues in Philosophy 3(3,0) Examination of a variety of issues of broad concern to philosophers today. Issues may vary. May be repeated once for credit with departmental consent.

PHIL 333 Metaphysics 3(3,0) Examination of issues and problems concerning the ultimate nature of reality. Topics may include the appearance/reality distinction, the nature of existence, freedom and determinism, personal identity, idealism and realism.

PHIL 343 Philosophy of Law 3(3,0) Explanation of the nature of legal theory and the law through a critical examination of the basic concepts and principles of these fields.

PHIL 344 Business Ethics 3(3,0) Study of ethical issues created by business activities, relating them to fundamental questions of ethics generally. Representative topics may include hiring, firing, promotions, business and minorities, organizational influence in private lives, consumer interests, economic justice, and reindustrialization.

PHIL 345 Environmental Ethics 3(3,0) Study of ethical problems in our dealings with the rest of nature and of how they relate to ethics in general. Representative topics include the basis of ethics, nature and intrinsic value, duties to future generations, economics and the environment, rare species, animal rights, ethics and agriculture, energy doctrine.

PHIL 346 Medical Ethics 3(3,0) Examines ethical dilemmas facing modern medicine. Topics may include controversies surrounding death, reproductive technologies, abortion, allocation of resources, the concept of disease, the doctor-patient relationship, and medical research.

PHIL 347 Ethics in Architecture 3(3,0) Interdisciplinary course focused on the architectural profession and the practices of design, building, and other processes in a social and business context. Consideration is given to both general moral principles and particular case studies.

PHIL 348 Philosophies of Art 3(3,0) Examines some of the predominant attempts to understand art in ancient and modern philosophy and also considers a variety of contemporary views and controversies about the nature, meaning, value, and future of art.

PHIL (NURS) 350 Technology and Philosophy in Nursing 3(3,0) See NURS 350.

PHIL 355 Philosophy of Mind and Cognitive Science 3(3,0) Critical examination of philosophical and scientific theories of mental phenomena and of the relationship between mental and material phenomena. Theories of Mind-Body Dualism, Monism, Functionalism, Eliminative and Reductive Materialism, Connectionism, and the status of folk psychology versus cognitive neuroscience are studied.

PHIL 360 Symbolic Logic 3(3,0) Introduction to the basic concepts of modern symbolic logic, including the symbolization of statements and arguments and the techniques of formal proof.

PHIL 370 Philosophy of War 3(3,0) Examines war from both ethical and strategic perspectives: the nature of a just war, the aims of war, and the kinds of general strategies appropriate for achieving those aims.

PHIL 375 Minds and Machines 3(3,0) Examines controversial questions in artificial intelligence and the Computational Theory of Mind. Topics: "Can machines think?" "What's involved in being able to think?" "Can machines reason, understand, be conscious, be self-aware, learn, be creative, have emotions, and use natural language?" Focus is on manmade computers and the mind as computer.

PHIL (REL) 393 Science and Religion 3(3,0) See REL 393.

PHIL 401, 601 Studies in the History of Philosophy 3(3,0)[1] In-depth study of a selected philosopher, philosophical school, or movement. Topics vary. With departmental consent, may be repeated once for credit. *Preq:* Consent of instructor.

PHIL 402, 602 Topics in Philosophy 3(3,0)[1] Thorough examination of a particular philosophical topic, issue, or problem. Topics vary. May be repeated once for credit with departmental consent. *Preq:* Consent of instructor.

PHIL 406, 606 Continental Philosophy for Arichtiects 3(3,0) Examines contemporary Continental philosophy over the course of the 20th century with the goal of offering the proper theoretical background to architecture students who use such theory in their studies and design work.

PHIL 425, 625 Philosophy of Psychology 3(3,0) Detailed examination of psychology as an autonomous science. Issues include explanation in psychology and cognitive neuroscience, psychology naturalized as a "special science" comparable to biology and geology, evolutionary psychology, philosophy and psychopathology, and moral issues in psychology. *Preq:* Nine hours of psychology or permission of instructor.

PHIL (A A H) 433, 633 Issues in Contemporary Art and Philosophy 3(3,0) Examines the intersections between recent developments in art and those in philosophy and critical theory. Course content varies, for example, Postmodernism in Art and Philosophy, Themes of Resistance in Contemporary Culture.

PHIL 485, 685 Topics in Philosophy of Biology 3(3,0) Detailed analysis of a selected topic in philosophy of biology/theoretical biology. Topics may include the levels of selection debate, sociobiology, genetic explanation and genetic causation, the species question, and the history and sociology of biology. *Preq:* Eight credit hours of biology or consent of instructor.

PHIL 499 Independent Study 1-3(1-3,0) Course of study designed by the student in consultation with a faculty member who agrees to provide guidance, discussion, and evaluation of the project. Student must confer with the faculty member prior to registration. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

[1]Current topics and course descriptions available in the department's course offering brochure.

PHYSICAL SCIENCE

PH SC 107 Introduction to Earth Science 4(3,3) Survey of topics in geology, meteorology, astronomy, and oceanography emphasizing comprehension and practical application of earth science concepts to experiments and activities appropriate for the elementary school classroom. Enrollment priority is given to Early Childhood and Elementary Education majors.

PH SC 108 Introduction to Physical Science 4(3,3) Survey of topics in chemistry and physics emphasizing comprehension and practical application of physical science concepts to experiments and activities appropriate for the elementary school classroom. Enrollment priority is given to Early Childhood and Elementary Education majors.

PH SC 301 Integrated Mathematics and Science 3(3,0) Modern concepts in mathematics and sciences are applied to current issues, paying special attention to the interconnectedness of scientific advances and economic and ethical issues. Presented through hands-on, inquiry-based activities, course prepares pre-service teachers to teach in the middle grades. *Preq:* General education mathematics and science requirements.

PHYSICS

Professors: P. B. Burt, D. D. Clayton, M. S. Daw, L. L. Larcom, M. F. Larsen, P. J. McNulty, *Chair;* J. R. Manson, J. W. Meriwether, G. X. Tessema, T. M. Tritt; *Associate Professors:* P. J. Flower, D. H. Hartmann, D. L. Hysell, M. D. Leising, B. S. Meyer; *Assistant Professors:* D. L. Carroll, J. A. Clayhold, M. P. Hickey, H. Jiang, D. C. Marinescu

PHYS 101 Current Topics in Modern Physics 1(0,2) Demonstrations and lectures serving as an introduction to different areas of physics and astronomy are presented by various members of the staff. May include such topics as astrophysics, energy, relativity, and weather, as well as visits to the planetarium.

PHYS 122, H122 Physics with Calculus I 3(3,0) First of three courses in a calculus-based physics sequence. Topics include vectors, laws of motion, conservation principles, rotational motion, oscillations, and gravitation. Credit for a degree will be given for only one of PHYS 122, 200, or 207. *Coreq:* MTHSC 108.

PHYS 124 Physics Laboratory I 1(0,3) Introduction to physical experimentation with emphasis on mechanical systems, including oscillatory motion and resonance. Computers are used in the experimental measurements and in the statistical treatment of data. *Coreq:* PHYS 122.

PHYS 200 Introductory Physics 4(3,2) Introduction to classical physics. Includes elements of mechanics, heat, electricity, and light. May not be substituted for PHYS 122 but may be substituted for PHYS 207, only with the approval of the Department of Physics and Astronomy. Credit for a degree will be given for only one of PHYS 122, 200, or 207. *Coreq:* MTHSC 105 or equivalent.

PHYS 207 General Physics I 4(3,2) Introductory course for students who are not majoring in physical science or engineering. Covers such topics as mechanics, waves, fluids, and heat. Credit for a degree will be given for only one of PHYS 122, 200, or 207. *Coreq:* Course that includes algebra and trigonometry.

PHYS 208 General Physics II 4(3,2) Continuation of PHYS 207. Covers such topics as electricity, magnetism, electromagnetic waves, optics, and modern physics. Credit for a degree will be given for only one of PHYS 208 or 221. *Preq:* PHYS 207.

PHYS 221, H221 Physics with Calculus II 3(3,0) Continuation of PHYS 122. Topics include thermodynamics, kinetic theory of gases, electric and magnetic fields, electric currents and circuits, and motions of charged particles in fields. Credit for a degree will be given for only one of PHYS 208 or 221. *Preq:* PHYS 122.

PHYS 222, H222 Physics with Calculus III 3(3,0) Continuation of PHYS 221. Topics include wave motion, electromagnetic waves, interference and diffraction, relativity, atomic particles, and atomic and nuclear structure. *Preq:* PHYS 221.

PHYS 223 Physics Laboratory II 1(0,3) Experiments in heat and thermodynamics, electrostatics, circuits, and magnetism. Computers are used in statistical treatment of data. *Coreq:* PHYS 221.

PHYS 224 Physics Laboratory III 1(0,3) Experiments involve atomic, molecular, and nuclear systems. Wave particle dualism of light and matter is emphasized. Calculators and computers are used in statistical treatment of data. *Coreq:* PHYS 222.

PHYS 240 Physics of the Weather 3(3,0) Descriptive introduction to meteorology. Includes atmospheric thermodynamics, solar radiation, heat budget, atmospheric circulation, force laws governing air motion, fronts, precipitation, synoptic prediction. Special topics of current interest such as the effect of environmental pollution on weather and the effect of weather on health are included.

PHYS 262 Physics of Music 3(3,0) Elementary, nontechnical study of the relationship between the laws of physics and the production of music for the music student or layman who wishes to understand the physical principles of the art. Topics include mechanical and acoustical laws, harmonic analysis, musical scales, sound production in instruments, physiology of hearing, etc.

PHYS 290 Physics Research 1-3(0,3-9) Individual research project in any area of experimental or theoretical physics or astronomy; supervised by a physics or astronomy faculty member. Project need not be original but must add to students' ability to carry out research. May be repeated for a maximum of six credits. *Preq:* Minimum grade-point ratio of 3.0; consent of instructor.

PHYS 300, H300 Introduction to Research 1(2,0) Acquaints students with current research in physics. Seminars are provided where research activities in various areas of physics and astronomy are summarized. Provides a basis for students to choose a suitable topic for a senior thesis. *Preq:* Junior standing in Physics.

PHYS 311 Introduction to the Methods of Theoretical Physics 3(3,0) Survey of methods and techniques of problem-solving in physics. Emphasizes the application of mathematical techniques to the solution of problems of vectors, fields, and waves in mechanics, electromagnetism, and quantum physics. *Preq:* PHYS 222 or consent of instructor.

PHYS 321, H321, 621 Mechanics I 3(3,0) Statics, motions of particles and rigid bodies, vibratory motion, gravitation, properties of matter, flow of fluids. *Preq:* PHYS 221.

PHYS 322, H322, 622 Mechanics II 3(3,0) Dynamics of particles and rigid bodies, Lagrangian and Hamiltonian formulations, vibrations of strings, wave propagation. *Preq:* PHYS 321 or consent of instructor.

PHYS 325, H325, 625 Experimental Physics I 3(1,4) Introduction to experimental modern physics, measurement of fundamental constants, repetition of crucial experiments of modern physics (Stern-Gerlach, Zeeman effect, photoelectric effect, etc.). *Coreq:* PHYS 321 or consent of instructor.

PHYS 326, H326, 626 Experimental Physics II 3(1,4) Continuation of PHYS 325.

PHYS 355, H355 Modern Physics 3(3,0) Study of the topics of modern physics, including relativity, atomic physics, quantum mechanics, condensed-matter physics, nuclear physics, and elementary particles. *Preq:* PHYS 222, MTHSC 206, or consent of instructor.

PHYS 401, H401 Senior Thesis (1-3) Semi-original theoretical, experimental, or computational research project performed under the direction of a faculty member. Fields available include astronomy, astrophysics, atmospheric physics, biophysics, high energy physics, relativity, solid state physics, and statistical mechanics. May be repeated for a maximum of six credits. *Preq:* Nine credits of physics at the 300/400 level.

PHYS 417, H417, 617 Introduction to Biophysics I 3(3,0) Introduction to the application of physics to biological problems. Topics include a review of elementary chemical and biological principles, physics of biological molecules, and fundamentals of radiation biophysics. *Preq:* MTHSC 206, PHYS 221, or consent of instructor.

PHYS 420, 620 Atmospheric Physics 3(3,0) Study of physical processes governing atmospheric phenomena. Topics include thermodynamics of dry and moist air, solar and terrestrial radiative processes, convection and cloud physics, precipitation processes, hydrodynamic equations of motion and large-scale motion of the atmosphere, numerical weather prediction, atmospheric electricity. *Preq:* MTHSC 108, PHYS 208 or 221.

PHYS 432, H432, 632 Optics 3(3,0) Covers a selection of topics, depending on the interest of the student. Topics may include the formation of images by lenses and mirrors, design of optical instruments, electromagnetic wave propagation, interference, diffraction, optical activity, lasers, and holography. *Preq:* PHYS 221.

PHYS 441, H441, 641 Electromagnetics I 3(3,0) Study of the foundations of electromagnetic theory. Topics include electric fields, electric potential, dielectrics, electric circuits, solution of electrostatic boundary-value problems, magnetic fields, and magnetostatics. *Preq:* PHYS 221 and MTHSC 208, or consent of instructor.

PHYS 442, H442, 642 Electromagnetics II 3(3,0) Continuation of PHYS 441. Study of foundations of electromagnetic theory. Topics include magnetic properties of matter, microscopic theory of magnetization, electromagnetic induction, magnetic energy, AC circuits, Maxwell's equations, and propagation of electromagnetic waves. Other topics may include waves in bounded media, antennas, electrodynamics, special theory of relativity, and plasma physics. *Preq:* PHYS 441 or consent of instructor.

PHYS 446, H446, 646 Solid State Physics 3(3,0) Introductory treatment of the crystal structure of solids and the properties of solids which depend on crystal structure, free electron model of metals, band theory of solids, Brillouin zones, crystalline defects, and diffusion. *Preq:* PHYS 222 or consent of instructor.

PHYS 452, H452, 652 Nuclear and Particle Physics 3(3,0) Study of our present knowledge concerning subatomic matter. Experimental results are stressed. Topics include particle spectra, detection techniques, Regge pole analysis, quark models, proton structure, nuclear structure, scattering and reactions.

PHYS 455, H455, 655 Quantum Physics I 3(3,0) Discussion of solution of the Schroedinger equation for free particles, the hydrogen atom, and the harmonic oscillator. *Preq:* PHYS 322 and 441, or consent of instructor.

PHYS 456, H456, 656 Quantum Physics II 3(3,0) Continuation of PHYS 455. Application of principles of quantum mechanics as developed in PHYS 455 to atomic, molecular, solid state, and nuclear systems. *Preq:* PHYS 455.

PHYS 465, H465, 665 Thermodynamics and Statistical Mechanics 3(3,0) Study of temperature development of the laws of thermodynamics and their application to thermodynamic systems. Introduction to low temperature physics is given. *Preq:* Six hours of physics beyond PHYS 222 or consent of instructor.

PHYS 475, 675 Selected Topics 1-3(0-3,0-9) Comprehensive study of a topic of current interest in the field of physics. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

PLANT PATHOLOGY

Professors: N. D. Camper, S. A. Lewis, *Chair;* S. W. Scott; *Associate Professors:* D. A. Kluepfel, M. B. Riley, *Research Associate*

PL PA 302, H302 Plant Pathology Research 1-3(0,3-9) Research experience in a plant pathology project for undergraduates who understand basic concepts of research. Students develop research objectives, procedures, and collect data. A written report includes interpretation of results. To be taken Pass/Fail only. *Preq:* Consent of instructor.

PL PA 401, H401, 601 Plant Pathology 3(2,2) Interrelationships between fungi, nematodes, bacteria, viruses, and mycoplasmas as causal agents of plant diseases, their hosts, and the environment. Diseases caused by abiotic factors, symptom development, diagnosis, economics, control, and relationship of plant diseases to human welfare are studied using examples of economically important diseases. *Preq:* BIOL 103, 104 or equivalent.

PL PA 402, H402, 602 Diseases of Ornamental Plants 3(2,2)S Odd-numbered years. Survival mechanisms, life cycles, host-parasite relationships, symptomatology, diagnosis, economics, and integrated control of infectious diseases; and causal factors, diagnosis, and control strategies of noninfectious diseases of ornamental plants. *Preq:* PL PA 401 or equivalent.

PL PA (ENT) 406, H406, 606 Diseases and Insects of Turfgrasses 3(2,2)F Host-parasite relationships, symptomatology, diagnosis, economics, and control of infectious and noninfectious diseases of turfgrasses; life histories, diagnosis, and control of important insect pests of turfgrasses. *Preq:* ENT 301 and PL PA 401 or equivalent.

PL PA 411, 611 Plant Disease Diagnosis I 2(1,2)SS Methods and procedures used in the diagnosis of plant diseases, especially late spring and early summer diseases. Basic techniques of pure culture and identification of plant pathogens and Koch's postulates are taught. Diagnosis of a wide variety of diseases of cultivated and wild plants is carried out. *Preq:* PL PA 401 or equivalent.

PL PA 451, 651 Bacterial Plant Pathogens 3(2,3)F Odd-numbered years. The nature, development, and control of plant diseases caused by bacteria. Taxonomic considerations, host-parasite relations and techniques used in isolating, identifying, and preserving bacterial plant pathogens. *Preq:* MICRO 305, PL PA 401, or consent of instructor.

PL PA 458, H458, 658 Plant Parasitic Nematodes 3(2,3)F Even-numbered years. Morphology and taxonomy of stylet-bearing nematodes and their relationship with plant diseases. *Preq:* BIOL 103/104 or 110/111.

PLANT PHYSIOLOGY

PL PH 320 Plant Medicine and Magic 3(3,0) Study of use of compounds of plant and fungal origin as poisons, hallucinogens, and pharmaceuticals. *Preq:* BIOL 104, CH 102, or permission of instructor.

POLITICAL SCIENCE

Professors: W. Lasser, M. A. Morris, M. W. Slann, *Chair;* S. H. Wainscott, J. D. Woodard; *Associate Professor:* B. W. Ransom; *Assistant Professors:* J. C. Granville, X. Hu, L. R. Olson, R. W. Smith, D. Swindell; *Visiting Instructors:* J. A. Hetherington, E. J. Knaysi, V. Matic, J. R. Willand-Dillard

PO SC 101, H101 Introduction to American Politics 3(3,0) Introduction to American National Government and politics with an emphasis on the functions of governmental organizations, the behavior of political parties and personalities, and the role of public opinion.

PO SC 102, H102 Introduction to Global Issues 3(3,0) Introduction to international politics, with an emphasis on a survey of the politics of the major world regions; America's role in world affairs; and selected current international issues and problems.

PO SC 104 Introduction to Comparative Politics 3(3,0) Introduction to the study of comparative politics in the post-Cold War era, with emphasis on theories and applications. Topics include democratic and nondemocratic systems; ideology; political culture; party systems; and legislative, executive, and judicial structures.

PO SC 250 Introduction to Political Science 3(3,0) Introduction to the study of political science, including an examination of key concepts in the discipline, methods and approaches to research in the various subfields, and skills and techniques of importance to the political science student. *Preq:* Sophomore standing.

PO SC 302 State and Local Government 3(3,0) Structural features, functions, and legislative, executive, and judicial processes of American state and local government.

PO SC 310 Special Activities 1-3(1-3,0) Special projects, approved by the department chair, which involve students in research, simulation, internships, or other actions requiring the study and application of political principles, and which are engaged in for at least one semester or its equivalent. No more than six hours credit from PO SC 310, 311, and 312 may be counted toward any degree. *Preq:* Consent of instructor.

PO SC 311 Model United Nations 1(0,1) Participation in United Nations simulation exercises, in competition with other colleges and universities. No more than six hours credit from PO SC 310, 311, and 312 may be counted toward any degree. *Preq:* Consent of instructor.

PO SC 312 State Student Legislature 1(0,1) Participation in state student legislature simulation exercises, in competition with other colleges and universities in the State. No more than six hours credit from PO SC 310, 311, and 312 may be counted toward any degree. *Preq:* Consent of instructor.

PO SC 321 General Public Administration 3(3,0) Introduction to public administration including the elements of organization, personnel and financial management, administrative law, and administrative responsibility. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 341 Quantitative Methods in Political Science 3(3,1) Introduction to quantitative research methods in political science. Topics include research design, measurement, data collection, sampling, procedures, and applications of statistical techniques to research problems in political science. Laboratory stresses computer use for elementary data analysis.

PO SC 343 The Mass Media in American Politics 3(3,0) Role and impact of the mass media in the American political system, with emphasis on the media's role in shaping public opinion and in influencing government and public policy. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC (E L E, PSYCH, SOC) 356 Social Science of Entrepreneurship 3(3,0) See SOC 356.

PO SC 361, H361 International Politics in Crisis 3(3,0) Factors contributing to the prevalence of tension and violence in the contemporary global arena are identified and analyzed, with particular emphasis on political, economic, and military roots and manifestations of conflict. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 362, 662 International Law and Organizations 3(3,0) Survey of obstacles to and advances in law and order in international relations. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 363 United States Foreign Policy 3(3,0) American foreign policy in historical perspective, with particular emphasis on the decision-making process, contemporary American capabilities and challenges, and analysis of key issues.

PO SC 367 Political Risk Assessment 3(3,0) Risks associated with conducting business and other activities in different countries, especially in the frequently unstable setting of the developing world. Major commercial providers of country risk assessment are identified and critiqued. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 371 European Politics 3(3,0) Major emphasis on European governments and issues of importance in the European context. Current methods of comparison are studied and applied to the formal and informal functioning of European governments. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 372 Political Culture of East Asia 3(3,0) Introduction to political culture that commonly characterizes East Asian countries, with emphasis on political subcultures of different nations, and on the analysis of the mutual influence between politics and culture. *Preq:* PO SC 101, 102, or 104; Junior standing; or consent of instructor.

PO SC 373, H373 Third World Politics 3(3,0) Survey of policies and problems of development of Third World states and their implications for the United States. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 375, H375 European Integration 3(3,0) Survey course analyzing increasing institutional cooperation between European countries with a focus on the European community. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 381 African American Politics 3(3,0) Examination of African American political thought, interests and agenda setting, and dynamics of African Americans' participation in political and governmental decision making. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC (SPAN) 382 Spanish Foreign Language News 1(1,0) Weekly discussions of Spanish-language news articles in the foreign press with an emphasis on politics and on the connections among political, economic, social, and cultural trends. Emphasis on Spanish vocabulary as well as cross-cultural contrasts with the United States. May be repeated for a maximum of three credits. *Preq:* SPAN 202 or equivalent or consent of instructor.

PO SC (FR) 383 French Foreign Language News 1(1,0) Weekly discussions of French-language news articles in the foreign press with an emphasis on politics and the connections among political, social, economic, and cultural trends. Emphasis on French vocabulary as well as cross-cultural contrasts with the United States. May be repeated for a maximum of three credits. *Preq:* FR 202 or equivalent or consent of instructor.

PO SC (GER) 384 German Foreign Language News 1(1,0) Weekly discussions of German-language news articles in the foreign press. German vocabulary is emphasized as well as cross-cultural contrasts with the United States. May be repeated for a maximum of three credits. *Preq:* GER 202 or equivalent or consent of instructor.

PO SC (SPAN) 385 Topical Issues in Spanish 1(1,0) Spanish-language readings and discussion of various topics in international politics. Emphasis on Spanish vocabulary as well as cross-cultural contrasts with the United States. May be repeated for a maximum of three credits. *Preq:* SPAN 202 or equivalent or consent of instructor.

PO SC (FR) 386 Topical Issues in French 1(1,0) French-language readings and discussion of various topics in international politics. Emphasis on French vocabulary as well as cross-cultural contrasts with the United States. May be repeated for a maximum of three credits. *Preq:* FR 202 or equivalent or consent of instructor.

PO SC (GER) 387 Topical Issues in German 1(1,0) German-language readings and discussion of various topics in international politics. Emphasis on relevant German vocabulary as well as cross-cultural contrasts with the United States. May be repeated for a maximum of three credits. *Preq:* GER 202 or equivalent or consent of instructor.

PO SC 389 Selected Topics 1-3(1-3,0) Examination of a selected area of political science. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

PO SC H395 Junior Honors Research Seminar 1(1,0) Readings and discussion to prepare for the Junior Research Paper and the Senior Thesis. Honors status required. *Preq:* Consent of instructor.

PO SC H396 Junior Honors Research 1(1,0) Readings and research in conjunction with an approved political science course at the 300 or 400 level. Honors status required.

PO SC 403 Congressional Politics 3(3,0) Examination of the behavior and processes of decision making in the American Congress together with an analysis of the interaction among Congress and the executive and judicial branches of the national government. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 405 Presidential Leadership 3(3,0) Examination of the organizational patterns, administrative behavior, and political forces in the Presidency with considerable emphasis on relations between the Presidency and Congress, courts, and administrative regulatory agencies. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 407 Religion and American Politics 3(3,0) Examination of the impact of religion on American politics, including an analysis of the role of religion in politics, political behavior of major religious groups, constitutional issues and voting behavior. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 409, 609 Directed Study in American Politics 3(3,0) Supervised reading and/or research in selected areas of American government. *Preq:* Consent of instructor.

PO SC 416, 616 Interest Groups and Social Movements 3(3,0) Empirical and normative examination of the origins, roles, and influence of interest groups and social movements in the United States and of the relationships among interest groups, social movements, and democratic theory. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 421, 621 Public Policy Processes 3(3,0) Introduction to public policy process, analysis, and evaluation. Topics include examination and comparison of policymaking models, policy analysis and decision-making techniques, and approaches to program evaluation. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 423, 623 Urban Politics 3(3,0) Interaction of political, technical, and administrative processes in urban America. Special emphasis is given to the history and future of urban areas. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 424, 624 Federalism and Intergovernmental Relations 3(3,0) Introduction to the historical, theoretical, legal, and fiscal aspects of constitutionally divided government. Federal, state, and local division of responsibility for public services is emphasized along with the emerging devolution of those responsibilities from the federal government to states and localities. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 427, 627 Public Personnel Management 3(3,0) Government personnel systems; current trends and problems; essentials of recruitment, classification, compensation, motivation, evaluation, training, and discipline. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 428, 628 National Security Policy I 3(3,0) Overview and analysis of the principal national security policy issues facing the United States, emphasizing weapons proliferation, arms control, support to military forces and operations, terrorism, intelligence/counterintelligence, narcotics and organized crime, and economic issues; and of the national security decision-making process. *Preq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 429, 629 National Security Policy II 3(3,0) Analysis, assessment, and management of specific country and regional security threats and challenges to the United States. Principal targets of assessment include rogue nations, regional superpowers, alliances, and areas of potential or ongoing threat or conflict. *Preq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 430 Public Policy Evaluation 3(3,0) Discussion of the role of policy analysis in government. Applications of analytical and computer tools to substantive policy areas such as transportation, economic/community development, education, poverty, and health. Students focus on assessing a policy from a set of options based on analytic criteria as well as developing policy alternatives. *Preq:* MTHSC 301 or PO SC 341 or equivalent.

PO SC 432, 632 American Constitutional Law I 3(3,0) Examination and analysis of Supreme Court decisions and other legal materials in the areas of national power, federalism, the separation of powers, and the role of the judiciary.

PO SC 433, 633 American Constitutional Law II 3(3,0) Examination and analysis of Supreme Court decisions and other legal materials in the areas of civil rights and civil liberties, with an emphasis on freedom of speech, freedom of religion, equal protection of the laws, and privacy rights.

PO SC 434 Law, Courts, and Politics 3(3,0) Introduction to the role of law, judges, and courts in the American political system, focusing on the nature of the legal system; legal methods; the role of courts in statutory construction and in the administrative process; and judicial activism and restraint. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 442, 642 Political Parties and Elections 3(3,0) Study of the distinctive features of the American two-party system with emphasis on presidential elections. Parties are examined as formal organizations, coalitions of voters and interest groups, coordinators of nomination and election processes, and managers of policy-making institutions. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 451 Classical Political Thought 3(3,0) Political philosophy from the pre-Socratic period to Machiavelli. *Preq:* PO SC 101, 102, Junior standing, or consent of instructor.

PO SC 452 Modern Political Thought 3(3,0) Early theories of the nation state in the 16th century and major political thinkers, problems, and movements through the 20th century. *Preq:* PO SC 101, 102, Junior standing, or consent of instructor.

PO SC 453 American Political Thought 3(3,0) American political philosophy from the 17th century to the present with emphasis on political and social developments since the 1770s. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 454, 654 Southern Politics 3(3,0) Examination of the unique political environment of the American South, with emphasis on the events and social forces which have shaped politics in the region since World War II. Course material is approached from a variety of perspectives, including history, literature, social themes, and political culture.

PO SC 457, 657 Political Terrorism 3(3,0) Examination and analysis of the international phenomenon of terrorism in terms of origins, operations, philosophy, and objectives. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 458, 658 Political Leadership 3(3,0) Comparative examination of political leaders, focusing particularly on types, methods, and consequences of leadership and on the relationship between leaders and followers. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 465 Foreign Policies of the Major Powers 3(3,0) Study in the foreign policies of the leading world powers, with particular emphasis on geographic, economic, historical, and political influences. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 471 Russian Politics 3(3,0) Introduction to Russian political institutions and culture since 1991 with a consideration of the Russian relationship with other member republics of the Commonwealth of Independent States. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 472 Japan and East Asia: Politics, Government, and Foreign Policy 3(3,0) Survey of Japanese politics, government, economy, and foreign policy, primarily in East Asia. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 476 Politics of the Middle East 3(3,0) Comparative examination of the political processes of the Middle East, emphasizing a sociocultural approach to the problems of political development. Emphasis on Iran, Iraq, Israel, Jordan, Lebanon, Syria, Turkey, and the United Arab Emirates. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 477 Chinese Politics 3(3,0) Concepts and operation of contemporary China's political system; emphasizes institutional innovation and political economy in recent reforms. *Preq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 478 Latin American Politics 3(3,0) Survey of prominent trends in Latin American politics, with a focus on major countries in the region and major issues affecting the region. Relations between Latin America and the United States and other prominent countries are also considered. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 479 Directed Study in Comparative and International Politics 3(3,0) Readings and research in comparative government and society and international affairs. *Preq:* Consent of instructor.

PO SC 480, 680 Gender and Politics 3(3,0) Examination of the role of gender in politics in the United States and in other countries. Particular emphasis on the role of women in electoral politics, the impact of nationalist violence, and development policies on women's lives, and on women's rights as human rights. *Preq:* PO SC 101, 102, Junior standing, or consent of instructor.

PO SC 482 The Political Novel and Film 3(3,0) Examination of political novels and films. Emphasizes the development of these media as art forms; the relationship between political novels and films and politics at large; and the role of these media in shaping public opinion. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 489, 689 Selected Topics 1-3(1-3,0) Intensive examination of a selected area of political science. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

PO SC H490 Senior Honors Thesis Research 3(3,0) Reading and research related to the senior honors thesis.

PO SC H491 Senior Honors Thesis 3(3,0) Research and writing of the senior honors thesis.

PORTUGUESE

PORT 101 Elementary Portuguese 4(3,1) Introductory course stressing speaking, listening, and writing. Attention is given to the sound system of Portuguese to develop basic communication skills.

PORT 102 Elementary Portuguese 4(3,1) Continuation of PORT 101. *Preq:* PORT 101 or consent of instructor.

PORT 201 Intermediate Portuguese 3(3,0) Intermediate course with more emphasis on communication skills and structure. Reading and writing practice in and outside the classroom, with special attention to idiomatic usage. Introduction to perspectives through readings and cultural activities. *Preq:* PORT 102 or consent of instructor.

PORT 202 Intermediate Portuguese 3(3,0) Continuation of PORT 201. *Preq:* PORT 201 or consent of instructor.

PSYCHOLOGY

Professors: T. R. Alley, R. L. Campbell II, P. A. Connor-Greene, J. A. McCubbin, *Chair;* D. D. Moore, J. W. Murdoch, F. S. Switzer III; *Associate Professors:* E. G. Brainerd, Jr., L. I. Park, D. J. Senn, B. R. Stephens, M.A.Taylor, R. A. Tyrrell; *Assistant Professors:* T. R. Britt, L. Gugerty, E. R. Muth, C. C. Pagano, C. L. S. Pury, P. Raymark; *Visiting Professors:* P. R. Alley, C. D. Tollison

PSYCH 201, H201 Introduction to Psychology 3(3,0) Introduction to the study of behavior. Analysis of the biological bases of behavior, learning, thinking, motivation, perception, human development, social behavior, and the application of basic principles to more complex phenomena such as education, personal adjustment, and interpersonal relations.

PSYCH 306 Human Sexual Behavior 3(3,0) Subject of sexual behavior is approached from the psychophysiological, behavioral, and cultural points of view. Evolutionary, historical, and cross-cultural perspectives are considered.

PSYCH 308 Women and Psychology 3(3,0) Explores the wide variety of psychological issues that concern women. Empirical research on topics such as motherhood, sex differentiation, motivation, and psychological disorders is emphasized. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH 309 Introductory Experimental Psychology 4(3,2) Introduction to the analysis of data from experimental and correlational research in psychology. Emphasis is placed on the applications and logical nature of statistical reasoning. Laboratory periods stress the techniques of data analysis using microcomputers. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH 310 Advanced Experimental Psychology 4(3,2) Continuation of PSYCH 309. Focus is on techniques of empirical research (experiments, quasi-experiments, survey research, etc.) that are widely used in psychology. Students design and carry out their own empirical research projects. Extensive practice in the writing of reports is included. *Preq:* PSYCH 201 with a C or better, PSYCH 309, or consent of instructor.

PSYCH 320 Principles of Behavior 3(3,0) Study of basic learning principles including classical conditioning, operant conditioning, and modeling. Initial emphasis is on animal studies followed by human applications and techniques. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH 324 Physiological Psychology 3(3,0) Study of human neuroanatomy with emphasis on the function of the nervous and endocrine systems. Discusses the biological basis of behavior in its normal and abnormal dimensions. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH 325 Physiological Psychology Laboratory 1(0,3) Demonstrations and techniques of selected physiological procedures are presented to explain the principles discussed in PSYCH 324. *Coreq:* PSYCH 324.

PSYCH 330 Motivation 3(3,0) Various aspects of motivation are considered by studying physiological, emotional, and environmental influences on behavior. Orientation is empirical rather than theoretical with emphasis on pertinent research, applications, and measurement of motives. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH 333 Cognitive Psychology 3(3,0) Study of higher-order mental processing in humans. Topics include memory, learning of concepts, problem solving, and the psychology of language. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH 334 Laboratory in Cognitive Psychology 1(0,2) Selected experiments and demonstrations are conducted to reveal phenomena related to human perception, memory, reasoning, problem solving, and high-level mental processes. *Preq:* PSYCH 201 with a C or better and PSYCH 309, or consent of instructor. *Coreq:* PSYCH 333.

PSYCH 340, H340 Lifespan Developmental Psychology 3(3,0) Survey of current theory and research concerned with the psychological aspects of human growth and development across the entire lifespan. Major topics include developmental methods, physical maturation, cognition, socialization, personality, psycholinguistics, intelligence, learning, behavior problems, and exceptionality. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH 344 Psychology of Adolescence 3(3,0) Study of the psychosocial processes of adolescence. Major emphasis is on personality development, growth of thinking, social and sexual maturation, and variations in adolescence. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH 345 Adulthood and Aging 3(3,0) Special consideration of the major psychological processes of aging as they relate to individual behavior and adaptation. Includes the influences of aging on the body, learning and psychomotor skills, thinking and intelligence, employment and productivity, personality, and psychopathology. Opportunity for contact with institutionalized and noninstitutionalized elderly persons is provided. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH 352, H352 Social Psychology 3(3,0) Survey course analyzing human social behavior from the perspective of the individual as a participant in social relationships. Major emphasis is on the study of such contemporary social processes as attitude formation and change, interpersonal relations, conformity, conflict resolution, aggression and violence, social communication, and group phenomena. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH 355 Environmental Psychology 3(3,0) Consideration of the influences of the physical environment on human behavior. Topics include perception of and adaptation to the environment, effects of physical design on behavior, and individual reactions to environmental stressors. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH (E L E, PO SC, SOC) 356 Social Science of Entrepreneurship 3(3,0) See SOC 356.

PSYCH 364 Industrial Psychology 3(3,0) Reviews the perception of work from the pre-industrial revolution to the present. Comparative approaches to motivation, development, maintenance, and attraction of successful work behaviors are discussed. Topics include the organization's responsibilities to the community, implementing a disease- and accident-free workplace, and the effects of consumerism. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH 368 Organizational Psychology 3(3,0) Analysis of individual behavior for the purpose of investigating problems in organizations and increasing organization effectiveness. Topics include psychological factors affecting communication, decision making, conflict, leadership, work stress, power, and organizational change. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH 370 Personality 3(3,0) Historical and contemporary views of individual differences in behavior, affect, health, coping, and motivation. Topics such as personality development and structure, personality assessment, cross-cultural issues, and applications of personality psychology are covered. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH 375 Psychology of Substance Abuse 3(3,0) Study of the psychological approaches to treatment of substance abuse. Topics include behavioral, social learning, and family-systems theories as applied to treating substance abuse. Emphasis is on empirical approaches to evaluating methods of treatment and matching clients to treatments. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH H385 The Social Construction of Madness 3(3,0) Study of the construct of mental illness and the variety of ways in which psychosis has been explained, portrayed, and treated over time. An interdisciplinary approach to examining representations of "madness" that shape a culture's understanding of mental illness and its treatment, including popular culture, art, and literature. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH H390 Honors Seminar in Psychology 3(3,0) Variable topic seminar for Honors students from all majors. Topics are announced prior to registration for each semester. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH 415 Systems and Theories of Psychology 3(3,0) Study of the development of psychology particularly during the past 100 years. Emphasis is on giving students a better perspective of present-day psychology. Focus is on the various approaches taken by influential psychologists and the conflicts among these approaches. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH 422, H422 Sensation and Perception 3(3,0) Study of psychophysical techniques of measurement and sensory and perceptual processes related to vision, hearing, and the other senses. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH 423 Sensation and Perception Laboratory 1(0,2) Selected experiments are conducted to demonstrate the phenomena involved in sensation and perception. *Preq:* PSYCH 309 or consent of instructor.

PSYCH 426, 626 Advanced Physiological Psychology 3(3,0) Advanced studies of the biological basis of behavior with emphasis on functional neuroanatomy and endocrinology. Topics may vary. May not be repeated for credit. *Preq:* PSYCH 324 or consent of instructor.

PSYCH 435 Human Factors Psychology 3(3,0) Analyses of theoretical issues and research methods related to the interaction between people and machines and human performance. Topics include information processing theory, human control systems and displays, task simulation, perceptual and motor factors limiting human performance. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH 443 Infant and Child Development 3(3,0) Cognitive, emotional, and social development from conception through childhood (up to age 12). Major theories and research findings are covered. *Preq:* PSYCH 201 with a C or better and PSYCH 340, or consent of instructor.

PSYCH 447 Moral Development 3(3,0) Explores the development of moral reasoning, judgment, and character from a descriptive psychological point of view. Examines the theoretical and empirical work of Jean Piaget, Lawrence Kohlberg, and Elliot Turiel as well as prosocial, eudaemonistic, and cross-cultural alternatives to these ideas. *Preq:* PSYCH 201 with a C or better; PSYCH 340, 344, or 345; or consent of instructor.

PSYCH 454 Psychology of Human Relationships 3(3,0) Research, theory, and their practical applications regarding the development, maintenance, and dissolution of human relationships; understanding successful and unsuccessful relationships. Emphasis is on improving the individual's ability to relate to other persons both interpersonally and professionally. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH 457, 657 Principles and Processes of Teamwork 3(3,0) Study of individual and group processes as they apply to team performance. Theories, research, and models of team functioning are examined as are applications of principles to ad hoc, business, multidisciplinary work, and computer-supported teams. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH 459, 659 Group Dynamics 3(3,0) Review of current theory and research on small-group processes with special emphasis given to group formation and development, group structure, the dynamic forces within a group, leadership, and group problem solving and decision making. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH 462, 662 Psychology and Culture 3(3,0) Seminar examining the cultural context in which psychological theories and research are generated and psychological perspectives on human diversity. Topics include the philosophical positions influencing psychological theory and research; methodological issues in the study of diversity, historical and contemporary perspectives; and cross-cutural psychological research in selected content areas. *Preq:* PSYCH 310 or consent of instructor.

PSYCH 471 Psychological Testing 3(3,0) Introduction to the theory of psychological testing, emphasizing the principles of measurement and psychometric characteristics of a good psychological test. Issues in test development, administration, and interpretation are reviewed. Educational, industrial, and clinical uses of tests are examined. *Preq:* PSYCH 201 and 309, or consent of instructor.

PSYCH 480, 680 Health Psychology 3(3,0) Study of the role of health-related behaviors in the prevention, development and/or exacerbation of health problems. Emphasis on the biopsychosocial model and its application in the assessment, treatment, and prevention of health problems. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH 483, 683 Abnormal Psychology 3(3,0) Study of the physiological, psychological, and cultural factors involved in such behavioral disorders as transient situational disturbances, personality disorders, psychoneuroses, psychoses, and psychosomatic disturbances. Special emphasis is placed on the advantages and disadvantages of particular conceptual models in labeling and describing behaviors as either normal or abnormal. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH 488 Theories of Psychotherapy 3(3,0) Survey of alternative theories of psychological treatment for behavioral and emotional disorders. Various theoretical assumptions, techniques, and applications of each approach are examined and compared, and case examples are considered. *Preq:* PSYCH 370 or 483 or consent of instructor.

PSYCH 489, 689 Selected Topics 3(3,0) Seminar in current topics in psychology. Topics change from semester to semester and are announced prior to each semester's registration. May be repeated once for credit, but only if different topics are covered. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH H490 Senior Division Honors Research I 2-4(2-4,0) Preparation and defense of a research proposal. Proposed project should be empirical, historical, or theoretical in nature. *Preq:* Junior standing, consent of department chair.

PSYCH H491 Senior Division Honors Research II 2-4(2-4,0) Completion of the proposed research project resulting in a written thesis. *Preq:* PSYCH H490.

PSYCH 493 Practicum in Clinical Psychology 3(1,5) Students apply classroom theory in solving individual and community problems through interaction with community agencies and other professional groups in the mental health area. Students have limited but well-controlled contact with actual clinical problems as they occur in the community environment. *Preq:* Consent of instructor.

PSYCH 495 Practicum in Applied Psychology 3(1,5) Students are provided practical experience in the area of applied psychology. Students usually are involved in a project designed to help solve an industrial problem through a direct application of industrial or social psychology. *Preq:* PSYCH 352 or 364 or 454; consent of instructor.

PSYCH 496 Laboratory in Psychology 1-3(0,2-6) Laboratory in a variety of topics in psychology such as human factors psychology and psychological testing. May be repeated for a maximum of three credits. *Preq:* PSYCH 201 with a C or better; PSYCH 309, 310; or consent of instructor.

PSYCH 497, H497 Directed Studies in Psychology 2-4(2-4,0) Study under the direction of a faculty member of a particular topic agreed upon by the student and faculty member and submitted to the department chair for approval. May be repeated for a maximum of six credits. *Preq:* Six credits in psychology, a course in research methods, and consent of instructor.

READING

READ 103 Learning Strategies 2(3,0) Students learn strategies of active learning and critical thinking skills which become an integral part of their natural thinking processes. Students learn how to generalize and apply newly acquired strategies to a variety of settings and situations.

READ 459, H459 Teaching Reading in the Early Grades: K–3 3(3,0) [W.1] Provides early childhood and Elementary Education majors an understanding of teaching reading in the elementary school setting in kindergarten through third grade. Students investigate general principles of language and literacy development and learn methods for teaching and assessing children's literacy. *Preq:* ED F 301, 302, 336; admission to the professional level. *Coreq:* ED 400 for Early Childhood majors.

READ 460, H460 Teaching Reading in the Intermediate Grades 4–8 3(3,0) Provides Elementary Education majors an understanding of teaching reading in the elementary school setting in grades four through eight. Students investigate general principles of language and literacy development and learn methods for teaching and assessing children's literacy. *Preq:* ED F 301, 302, 334. *Coreq:* ED 401 (Elementary majors); admission to the professional level.

READ 498, H498 Secondary Content Area Reading 3(2,2) Designed for pre-service teachers who are involved with field experiences prior to student teaching full time. Prepares content area teachers to teach the reading skills necessary for effective teaching of content area material. *Preq:* Admission to professional level.

RELIGION

Professor: N. A. Hardesty; *Assistant Professor:* S. E. Grosby

REL 101 Introduction to Religion 3(3,0) Variety of religious experience and expression in human life.

REL 102 World Religions 3(3,0) Survey of major religious traditions of the world.

REL 301 The Old Testament 3(3,0) Survey of the books of the Old Testament with special consideration given to the development of the concepts, institutions, and theology of the ancient Hebrews.

REL 302 Survey of New Testament Literature 3(3,0) Study of the books of the New Testament from the standpoint of their occasion, content, literary form, and basic theology.

REL 306 Judaism 3(3,0) Examines the development of Judaism from Biblical to modern times.

REL 307 The Christian Tradition 3(3,0) Examination of the development of Christianity in Western civilization from the post-New Testament period to the present, stressing institutional growth and changes, theological currents, and interaction of Christianity with culture.

REL 308 Religions of the Ancient World 3(3,0) Selected religious movements in ancient Mesopotamia, Egypt, Canaan, and the Greco-Roman world with emphasis on movements outside the Judeo-Christian tradition.

REL 310 Religion in the United States 3(3,0) Development of religion in the U. S. from the Colonial period to the 20th century. Attention is devoted to analyzing broad currents in religious movements and religious thought which have given shape to the American pluralistic experience.

REL 311 African American Religion 3(3,0) Study of the religious milieu in the U. S. rooted in our African heritage. Background on African tribal religion is included, along with Christian denominations and new religions such as Nation of Islam, Rastifarianism, Voudun, Santeria, and Candomble.

REL (PHIL) 393 Science and Religion 3(3,0) Exploration and analysis of the conceptual and historical relationship between science and religion. Examination and evaluation of the theoretical claims of science and the metaphysical claims of religion.

REL 401, 601 Studies in Biblical Literature and Religion 3(3,0) Critical examination of a selected topic in biblical studies. Topics vary from year to year. May be repeated once for credit. *Preq:* Consent of instructor.

REL 402, 602 Studies in Religion 3(3,0) Thorough examination of a selected topic in one or more of the religious traditions of the world or of religious life in a particular region. Topics vary from year to year. May be repeated once for credit. *Preq:* Consent of instructor.

REL 499 Independent Study 1-3(1-3,0) Study of selected problems, issues, or movements in religion under the direction of a faculty member chosen by the student. Student and faculty member develop an individualized course of study approved by the department chair prior to registration. *Preq:* Consent of instructor.

RURAL SOCIOLOGY

Professor: E. L. McLean

R S 301 Rural Sociology 3(3,0)S Study of human social relationships as influenced by life in the open country and in small towns and villages including considerations of the rural population, rural social institutions, processes of change in agricultural technology, and community area planning and development.

R S (SOC) 303 Methods of Social Research I 4(3,3) See SOC 303.

R S (SOC) 371 Population and Society 3(3,0) See SOC 371.

R S (SOC) 401, 601 Human Ecology 3(3,0)S Analysis of the interrelationships between the physical world, modifications in natural environments, human settlement patterns, and institutions that both encourage and regulate environmental modification. Emphasis is placed on conditions whereby natural resources become public policy concerns. *Preq:* Sophomore standing.

R S (SOC) 459, 659 The Community 3(3,0)F Close analysis of the development of contemporary communities and their place in society. Continuing effects of industrialization, migration, and technological change on community location and structure are examined. Structural relations of social class, status, and the associations among institutions are explored.

R S (SOC) 471, H471, 671 Demography 3(3,0)F Demographic concepts, theory, and research methods for vital statistics, migration, and population distribution and projections. Collection and processing of demographic data and organization of demographic data systems. *Preq:* ANTH 201 or SOC 201 or R S 301.

R S (SOC) 495 Field Experience 3(1,8) See SOC 495.

R S (SOC) 498 Independent Study 3(1,6) See SOC 498.

RUSSIAN

Assistant Professor: G. L. Love; *Lecturer:* J. Bridgwood

RUSS 101 Elementary Russian 4(3,1) Training in pronunciation, grammatical forms, and syntax with a view to giving the student the fundamentals necessary to hold simple conversations and to read simple Russian texts.

RUSS 102 Elementary Russian 4(3,1) Continuation of RUSS 101. *Preq:* RUSS 101.

RUSS 201, H201 Intermediate Russian 3(3,0) Brief review of RUSS 101 and 102 with conversation, composition, and dictation, and the beginning of more serious reading of Russian prose in short stories and plays. *Preq:* RUSS 102.

RUSS 202, H202 Intermediate Russian 3(3,0) Conversation, composition, and dictation based on readings of more difficult Russian prose than in the earlier courses. *Preq:* RUSS 201.

RUSS 305 Russian Conversation and Composition 3(3,0) Practice in spoken Russian emphasizing vocabulary building, pronunciation, and comprehension. Written exercises promote accuracy. *Preq:* RUSS 202 or consent of department chair.

RUSS 307 Russian Civilization 3(3,0) Introduction to significant elements of Russian civilization. Emphasis is on social, geographical, political, and artistic aspects of modern Russia. Taught in Russian. *Preq:* RUSS 202 or consent of department chair.

RUSS 398 Directed Reading 1-3(1-3,0) Directed study of selected works in Russian. May be repeated for a total of six credits. *Preq:* RUSS 202 or equivalent and consent of department chair.

SOCIOLOGY

Professors: J. M. Coggeshall, J. W. Ryan, *Chair;* B. J. Vander Mey, D. A. Ward, W. M. Wentworth; *Associate Professors:* J. E. Hawdon, L. G. Peppers, D. K. Sturkie III; *Assistant Professors:* L. C. Gordon, S. P. Griffin, F. C. Mobley, J. C. Witte; *Visiting Lecturers:* P. S. Davis, L. A. Stewart-Muns

SOC 201, H201 Introduction to Sociology 3(3,0) Sociological perspective: the study of contemporary groups, organizations, and societies in terms of human social behavior, social change, social structure, and social institutions.

SOC 202 Social Problems 3(3,0) Social problems involving the family, education, health care, political and legal systems, economy, population, environment, community; and special problems associated with age, economics, racial status, and gender inequality.

SOC 235 Introduction to Leadership 3(3,0) Introduction to leadership in various organizational settings from a sociological perspective. Examines the concept of leadership, leadership traits, types of leadership, and the evolution of leadership behaviors in the nineteenth and twentieth centuries.

SOC (R S) 303, H303 Methods of Social Research I 4(3,3) Introduction to methods of social research: research design, sampling, measurement, reliability, and validity; the relationship between theory and research. Coordinating laboratory introduces students to computer literacy through research. Required of all Sociology majors. *Preq:* CP SC 120, MTHSC 203 or 301 or EX ST 301, SOC 201.

SOC 310, H310 Marriage and Intimacy 3(3,0) Examination of mate selection, living together, marital relations, family planning, conflict resolution, divorce and remarriage, later life adjustments, and singlehood as a lifestyle in the United States. *Preq:* SOC 201 or consent of instructor.

SOC 311 The Family 3(3,0) Introduction to the family as a social institution. Primary focus is on families in the U. S. Topics include history of the family, demographic trends in family formation and dissolution, division of labor, intergenerational relationships, family violence, and family policy. Analyses of race, class, and gender are incorporated. *Preq:* SOC 201 or consent of instructor.

SOC 312 Nonwestern Families 3(3,0) Explores the complexities of family life and patterns of gender stratification in nonwestern societies. Addresses the variation in family life by and within race, ethnicity, religion, class, age, culture, and geographic region. *Preq:* SOC 201 or 311 or consent of instructor.

SOC 330 Work and Careers in Society 3(3,0) Introduces changes in the structure of work from pre-industrial to postindustrial periods. Topics include the effects of stratification on career decisions, career paths and implications for life changes, social effects of scientific management of work, unionization, globalization, the rise of multinational corporations, and cross-cultural comparisons of management styles. *Preq:* SOC 201 or consent of instructor.

SOC 331 Urban Sociology 3(3,0) Urbanization as a social process and related conditions of work, family structure, social mobility, crime, lifestyle, technology, and development of urban areas in the Third World. *Preq:* SOC 201.

SOC 350 Self and Society 3(3,0) Social psychology from the sociological viewpoint. Examination of the interactional and group influences on such individual conditions as childhood and life-course development, language, emotions, motives, sexuality, deviance, and self-concept. *Preq:* SOC 201.

SOC 351 Collective Behavior 3(3,0) Spontaneous, transitory, and sporadic group behavior: crowds, panics, riots, fads, and social movements. *Preq:* SOC 201.

SOC (E L E, PO SC, PSYCH) 356 Social Science of Entrepreneurship 3(3,0) Examines those areas of the social sciences that have direct relevance for entrepreneurs. Topics include processes by which entrepreneurs are shaped by social institutions such as the family and community, public policy implications and influences on entrepreneurship, risk perception, decision making, motivation, leadership, and group dynamics. *Preq:* SOC 201 or 235 or PSYCH 201 or PO SC 101 or 102 or 104 or consent of instructor.

SOC (R S) 371 Population and Society 3(3,0) Social, economic, and political consequences of population structure and change, including problems of food and resources, as well as population goals and policies in developing countries and the United States. *Preq:* SOC 201.

SOC 380 Introduction to Social Services 3(3,0) Fundamentals of casework practice, including philosophy and values, models of group work, and ethics in social services work. *Preq:* SOC 201.

SOC 390 The Criminal Justice System 3(3,0) Social systems analysis of criminal justice agencies; primary focus on law enforcement and corrections and their interagency relationship with courts and prosecution. *Preq:* SOC 201.

SOC 391 Sociology of Deviance 3(3,0) Patterns of deviant behavior: subcultures, careers, and lifestyles of deviants; deviance theory and research. *Preq:* SOC 201.

SOC 392 Juvenile Delinquency 3(3,0) Nature, extent, and causes of juvenile delinquency; societal attempts to control delinquent conduct and gang violence; emergence of the juvenile justice system. *Preq:* SOC 201.

SOC 393 Criminology 3(3,0) Nature and causes of criminal behavior; societal attempts to control crime; social responses to crime, criminals, and the criminal justice system. *Preq:* SOC 201.

SOC 394, H394 Sociology of Mental Illness 3(3,0) Mental illness as a social phenomenon, including cultural and social influence, organizational settings of mental health-care delivery, legal issues, patient-therapist relationships, and mental illness intervention as social control. *Preq:* SOC 201.

SOC 396 Alcoholism: Social Causes, Consequences and Treatment 3(3,0) Issues involved in alcoholism and alcohol abuse, assessment of sociological and social-psychological theories of alcoholism and prevention; societal problems associated with the misuse of alcohol. Students who have taken SOC 395 may not receive credit for SOC 396. *Preq:* SOC 201 or consent of instructor.

SOC 397 Drug Abuse: Social Causes, Consequences and Treatment 3(3,0) Issues involved in drug abuse other than alcohol; assessment of sociological and social-psychological theories of drug use, abuse, and treatment; societal problems associated with the misuse of drugs other than alcohol. Students who previously have taken SOC 395 may not receive credit for SOC 397. *Preq:* SOC 201 or consent of instructor.

SOC (R S) 401, 601 Human Ecology 3(3,0) See R S 401.

SOC 404, 604 Sociological Theory 3(3,0) Survey of the development of sociological theory. Required of all Sociology majors. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC H408 Honors Thesis Research I 3 Reading and research related to senior honors thesis. Completion of junior honors requirements and approval of department chair and thesis advisor required. *Preq:* SOC H303, H310, honors status.

SOC H409 Honors Thesis Research II 3 Research and writing related to the senior honors thesis. *Preq:* SOC H408, honors status.

SOC 414, 614 Policy and Social Change 3(3,0) Uses the sociological perspective to examine policy development, implementation, and evaluation in the public and private sectors. Specifically, focuses on values and ethics and effects of social change efforts on the outcomes of policy formation, social planning, and implementation. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 430, 630 Sociology of Organizations 3(3,0) Analysis of administrative organizations and voluntary associations; applied analysis of their formal and informal group relations, communications, and effectiveness. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 432 Sociology of Religion 3(3,0) Sociological analysis of religious systems and movements and their influence on other social institutions. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 433, 633 Globalization and Social Change 3(3,0) Examination of the social and historical causes of development and underdevelopment. Various sociological theories of development are reviewed. Selected countries are examined in an international context. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 435, 635 Leadership and Team Building 3(2,3) Introduction to the area of leadership and the process of building effective teams. Examines various sociological perspectives on leadership and their role in developing and maintaining various types of groups. Students are actively involved in the educational process through participation in experiential learning opportunities. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 440, 640 Leisure, the Mass Media, and Culture 3(3,0) Production and consumption of leisure activities in contemporary society; popular culture and the mass media as dominant leisure forms; social effects of leisure activities; relationship between work and leisure. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 441, 641 Sociology of Sport 3(3,0) Sport as a social phenomenon; emphasis on leadership, discrimination, socialization, communication, conflict, and cooperation in sports; emerging social issues in contemporary sports. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC (R S) 459, 659 The Community 3(3,0) See R S 459.

SOC 460, 660 Race, Ethnicity, and Class 3(3,0) Investigation of sociological perspectives on race, ethnic relations, and social stratification. Analysis of the impact of social class on minority movements. Not open to students who have taken SOC 431. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 461 Sex Roles 3(3,0) Female and male socialization; changes in statuses, roles, inequality, and opportunities in contemporary society, with cross-cultural and social class comparisons. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 462, 662 Men, Masculinity, and Society 3(3,0) Masculinity and social order: norms, roles, relationships, and activities; identity and socialization: work, family, sexuality, war, sports, including subcultural comparisons. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 463, 663 Sociology of Parenting 3(3,0) Sociology of parenting, child rearing, parenting styles and outcomes; social change and parenting; variations by sex, race, and class; cross-cultural comparisons; research-based, with applied orientation. *Preq:* SOC 201, Junior standing.

SOC 464 Poverty and Social Policy 3(3,0) Examines the causes and consequences of poverty in the U. S. The history of poverty and social welfare programs in the U. S. and in Europe are compared and used to evaluate current trends in welfare reform. Analyses of class, race, and gender stratification are central to the course. *Preq:* SOC 201 or 311 or consent of instructor.

SOC (R S) 471, 671 Demography 3(3,0) See R S 471.

SOC 480, 680 Medical Sociology 3(3,0) Sociocultural factors in the etiology and treatment of physical illness; medical occupations and professions; the organization of health-care delivery systems. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 481, 681 Aging and Death 3(3,0) Sociological orientation to aging populations focusing on the impact of health care, welfare, and retirement systems. Includes dying as a social phenomenon, suicide, euthanasia, and funerals. Not open to students who have taken SOC 383. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 484, 684 Child Abuse and Treatment 3(3,0) Comprehensive examination of child abuse, neglect, and exploitation as major social problems; causes, effects, and prevalence of physical, sexual, and emotional maltreatment; definitional controversies; social policy and legal considerations; therapeutic approaches for children and their caretakers; child maltreatment and the judicial system. *Preq:* SOC 201 and Senior standing or consent of instructor.

SOC 491 The Sociology of Policing 3(3,0) Introduction to the major issues of contemporary policing in the U. S. from a sociological perspective. Topics include the changing functions and structure of policing, the police subculture, and the role of the police in a liberal democracy. *Preq:* SOC 390 or permission of instructor.

SOC 493, 693 Sociology of Corrections 3(3,0) Analysis of correctional alternatives. Topics include sentencing strategies and their impact, prison populations (male, female, and juvenile), inmate social structures, treatment and custody issues, community-based alternatives (probation, parole, electronic monitoring, and work release), and correctional management issues. *Preq:* SOC 390 or permission of instructor.

SOC (R S) 495 Field Experience 3(1,8) Students participate in selected field placements under supervision for eight hours weekly and in a one-hour seminar per week. May be repeated once for credit. To be taken Pass/Fail only. *Preq:* SOC 380 or 390 and consent of department chair.

SOC (R S) 498 Independent Study 3(1,6) Individual readings or projects in sociological areas not covered in other courses. A written proposal approved by the instructor directing the work and by the department chair prior to registration. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

SOC 499 Seminar in Selected Topics in Contemporary Sociology 3(3,0) Sociological areas of current interest are explored. May be repeated by special arrangement for a maximum of six credits. *Preq:* Consent of department chair.

SPANISH

Professors: G. Bautista, P. R. Heusinkveld, S. C. King, *Chair;* M. A. Morris; *Associate Professors:* C. R. Adams, J. K. Hurley; *Assistant Professors:* C. L. Chávez, C. M. Coria-Sánchez, N. Corrales, R. A. Klein, M. M. Rojas-De-Massei; *Instructors:* M. Fernandez, C. A. Robison, S. E. Spacciante, M. Roth; *Lecturers:* S. K. Harris, H. Risso, N. M. Salazar, R. K. Simpson, T. M. Tumlin

SPAN 101 Elementary Spanish 4(3,1) Course for students with no previous experience in Spanish study. The fundamentals of grammar and vocabulary are taught, and a foundation is provided for building oral and written proficiency. Three hours a week of classroom instruction and one hour a week in the language laboratory.

SPAN 102 Elementary Spanish 4(3,1) Continuation of SPAN 101.

SPAN 104 Basic Spanish 4(3,1) First-year course for students who have previously studied Spanish. Upon completion, students are prepared to enter Intermediate Spanish. May not be taken by students who have completed SPAN 101 or 102.

SPAN 121 Accelerated Spanish I 8(6,2) Accelerated 8-credit course for students with two or more years of Spanish in high school. Can be taken in lieu of SPAN 101 and 102. Through fundamental grammar, conversation, composition, and dictation, proficiency is stressed. May not be taken by students who have completed SPAN 101 or 102.

SPAN 151 Spanish for Graduate Students 3(3,0) Intensive program only for graduate students preparing for the reading examination in Spanish. A minimum grade of *B* on a final examination will satisfy graduate school foreign language requirement. May be repeated once. To be taken Pass/Fail only. *Preq:* Graduate standing.

SPAN 201, H201 Intermediate Spanish 3(3,0) Intermediate course to practice listening, speaking, reading, and writing. Grammatical structures and basic vocabulary are reviewed systematically. Includes literary and cultural perspectives. *Preq:* SPAN 102, 121, or consent of department chair.

SPAN 202, H202 Intermediate Spanish 3(3,0) Continuation of SPAN 201. *Preq:* SPAN 201.

SPAN 221 Accelerated Spanish II 6(6,0) Accelerated intermediate course that can be taken in lieu of SPAN 201 and 202. Through conversation, composition, dictation, and intensive grammar review, proficiency is stressed. Includes literary readings and cultural perspectives. May not be taken by students who have completed SPAN 201 or 202. *Preq:* SPAN 102, 121, or consent of department chair.

SPAN 299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign language drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a total of three credits. *Preq:* Consent of instructor directing the play.

SPAN 301 Introduction to Hispanic Literary Forms 3(3,0) Introduction to the basic structures and elements of fiction, poetry, drama, and essay, including literary and critical theory, with readings in 19th and 20th century Spanish and Spanish-American literature. *Preq:* SPAN 202.

SPAN 302 Intermediate Spanish Grammar and Composition 3(3,0) Intensive review of Spanish structure, verbs, idioms, and vocabulary with an introduction to syntax and stylistics through controlled and free composition. *Preq:* SPAN 202 or consent of department chair.

SPAN 303 Survey of Spanish Literature I 3(3,0) Literary movements, influences, and authors from the beginning to the end of the 17th century; representative works, discussions. *Preq:* SPAN 202 or consent of department chair.

SPAN 305 Intermediate Spanish Conversation and Composition I 3(3,0) Practice in spoken Spanish with emphasis on vocabulary, pronunciation, intonation, and comprehension; written work to increase accuracy; assignments in the language laboratory. *Preq:* SPAN 202 or consent of department chair.

SPAN 307 The Hispanic World: Spain 3(3,0) Introduction to the significant aspects of the culture of Spain from its origins to the present. Emphasis on the artistic, social, historical, political, and contemporary issues of the Iberian peninsula. *Preq:* SPAN 202 or consent of department chair.

SPAN 308 The Hispanic World: Latin America 3(3,0) Introduction to the significant aspects of the culture of Spanish-American countries. Emphasis is placed on the development of the political, economical, geographical, social, and artistic aspects of Spanish America from the indigenous period to the present. *Preq:* SPAN 202 or consent of department chair.

SPAN 309 Introduction to Spanish Phonetics 3(3,0) Study of basic concepts of phonetics and phonology, fundamental principles of Spanish pronunciation and International Phonetic Alphabet. *Preq:* SPAN 202 or consent of department chair.

SPAN 310 CLIP Summer Immersion Program 6(6,0) Conducted entirely in Spanish for eight hours daily. Program consists of activities that combine interrelating cultural topics with language skill practice. Frequent opportunities to converse with native speakers during meals and on excursions. Students receive six credits, three of which may be taken in lieu of 202. *Preq:* SPAN 201.

SPAN 311 Survey of Spanish-American Literature 3(3,0) Literary movements, influences, authors, and works from the Colonial period to the present. *Preq:* SPAN 202 or consent of department chair.

SPAN 316 Spanish for International Trade I 3(3,0) Introduction to commercial Spanish; study of the spoken and written language, protocol, and cultural environment of the Spanish-speaking business world. Business vocabulary, basic business and cultural concepts, and situational practice. Grammatical review through business letters, professional documents and commercial reports. Reading and analysis of commercial texts. *Preq:* Any 300-level Spanish language or literature class.

SPAN 318 Spanish Through Culture 3(3,0) Topic-generated conversation course in Spanish through a broad array of artistic manifestations in the Hispanic World, with emphasis in conversation and short written exercises. Focuses on one Hispanic culture topic which provides a basis for class discussion and short written compositions in Spanish. *Preq:* SPAN 202 or consent of department chair.

SPAN (PO SC) 382 Spanish Foreign Language News 1(1,0) See PO SC 382.

SPAN (PO SC) 385 Topical Issues in Spanish 1(1,0) See PO SC 385.

SPAN H391 Honors Introduction to Hispanic Literary Forms 1(1,0) One-hour independent study to allow honors students to pursue supervised research on some aspect of Hispanic literature. *Coreq:* SPAN 301, membership in Calhoun Honors College Program.

SPAN H392 Survey of Spanish Literature (Honors) 1(1,0) Independent study allowing honors students to pursue supervised research on witchcraft in 15th and 16th century Spain. *Coreq:* SPAN 303, membership in Calhoun Honors College Program.

SPAN H393 The Hispanic World: Latin America (Honors) 1(1,0) One-hour independent study to allow honors students to pursue supervised research on a topic related to Hispanic American history, politics, geography, economics, social institutions, or artistic movements. *Coreq:* SPAN 308, membership in Calhoun Honors College Program.

SPAN 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in Spanish literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

SPAN 401 New Spanish Fiction 3(3,0) Study of selected readings by popular emerging and established authors of Spain, with emphasis on current cultural trends. Readings include, but are not limited to, detective novels, regional fiction, and fiction from marginalized groups in Spain. *Preq:* SPAN 300-level literature course or consent of department chair.

SPAN 403 Spanish American Women Writers 3(3,0) In-depth study of selected literary works by Spanish American women. Representative authors are studied within their philosophical and socio-political contexts. *Preq:* Spanish 300-level literature course or consent of department chair.

SPAN 404 Nineteenth and Twentieth Century Spanish Literature 3(3,0) Selected readings from major authors in Spain. Emphasis is on readings in poetry, theatre, short story, and novels from the nineteenth century to the early twentieth century. *Preq:* Spanish 300-level literature course or consent of department chair.

SPAN 405 International Trade and Literature 3(3,0) Readings in the social, economic, and political changes of the Hispanic world in fiction and nonfiction. Study of the importance of social changes that have shaped the economies of Hispanic countries. *Preq:* Spanish 300-level literature, culture course or consent of department chair.

SPAN 406 Hispanic Narrative Fiction 3(3,0) Topic-generated readings from Spanish America and/or Spain. Readings consider gender issues, the family, ethnicity, religion, politics, history or socio-economic issues in the Hispanic world. *Preq:* Spanish 300-level literature or culture course or consent of department chair.

SPAN 407 Hispanic Film 3(3,0) Films are "read" as texts that mirror Hispanic society. Beside learning about cinematographic techniques in Spanish, topics include comparative analysis of film and literature, film as propaganda, film as "blockbuster," and the cinematic depiction of social, cultural, and historical realities of Hispanic nations. *Preq:* Spanish 300-level language, literature, or culture course or consent of department chair.

SPAN 409 Comprehensive Writing in Spanish 3(3,0) Study of stylistics in addition to grammar review; writing paragraphs, short compositions, and creative papers in Spanish on both fiction and non-fiction topics. *Preq:* Any 300-level Spanish course or consent of department chair.

SPAN 411 Advanced Spanish Conversation and Composition 3(3,0) Continuation of SPAN 305 with emphasis on greater fluency and sophistication in oral and written expression. *Preq:* SPAN 305 or consent of department chair.

SPAN 416 Spanish for International Trade II 3(3,0) Study of more complex business vocabulary, cultural concepts, and environment of Hispanic markets. Social, political, and economic issues related to Spanish-speaking countries and their current economies in global marketing. Economic geography of Hispanic countries, company organization, management, banking, investment, goods and services, and marketing. *Preq:* SPAN 316.

SPAN 417 Professional Communication 3(3,0) Skill-oriented course, taught in a seminar format. Students learn established "protocol" for addressing various Spanish-speaking audiences and learn to give professional presentations in Spanish. *Preq:* Spanish 300-level course or consent of department chair.

SPAN 422 The Contemporary Spanish-American Novel 3(3,0) New trends in the development of the Spanish-American novel from the 1940s to the present. *Preq:* Spanish 300-level literature course or consent of department chair.

SPAN 435 Contemporary Hispanic Culture 3(3,0) Study of social, political, economic, and artistic manifestations of contemporary Hispanic culture. *Preq:* Spanish 300-level civilization or culture course or consent of department chair.

SPAN H438 Spanish Honors Research 3(3,0) Individual honors research conducted under direction of the Language Department faculty. *Preq:* Junior standing, membership in Calhoun Honors College Program.

SPAN H439 Spanish Honors Thesis 3(3,0) Individual honors research conducted and thesis completed under direction of Language Department faculty member. *Preq:* Junior standing, SPAN H438, membership in Calhoun Honors College Program.

SPAN H491 Hispanic Narrative Fiction (Honors) 1(1,0) One-hour independent study to allow honors students to pursue supervised research on the socio-political climate under Franco's dictatorship, with emphasis on contemporary literary theory. *Coreq:* SPAN 406, membership in Calhoun Honors College Program.

SPAN H492 Contemporary Latin American Novel (Honors) 1(1,0) One-hour independent study to allow honors students to pursue supervised research in the literary and cinematographic images of magic realism. *Coreq:* SPAN 422, membership in Calhoun Honors College Program.

SPAN 498 Independent Study 1-3(1-3,0-3) Directed study of selected topics in Spanish language, literature, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

SPAN 499, 699 Special Topics 3(3,0) Study of timely or special topics in Spanish. May be repeated for a total of six credits, but only if different topics are covered. *Preq:* Consent of department chair.

SPECIAL EDUCATION

Professor: A. Katsiyannis; *Associate Professors:* M. J. Hodge, P. M. Stecker; *Assistant Professors:* R. W. Buford, D. Zhang

ED SP 370, H370 Introduction to Special Education 3(3,0) Survey of students with disabilities and with gifts/talents. Individuals with Disabilities Education Act is emphasized, including general educator's role in serving students with special needs. Characteristics, assessment, and effective instructional procedures for students of varying exceptionalities are addressed. *Preq:* Minimum grade-point ratio of 2.0.

ED SP 371 Characteristics of the Mildly Handicapped 3(3,0) Surveys the characteristics which distinguish the mildly/moderately handicapped from the more severely handicapped. *Preq:* Minimum grade-point ratio of 2.0.

ED SP 372 Characteristics and Identification of and Strategies for Individuals with Learning Disabilities 3(3,0) In-depth coverage of characteristics and identification procedures for individuals with learning disabilities. Effective instructional strategies are addressed. Students participate in field experience throughout the semester. *Preq:* ED SP 370.

ED SP 373 Characteristics and Instruction of Individuals with Mental Retardation 3(3,0) In-depth coverage of characteristics and identification procedures for individuals with mental retardation. Effective instructional strategies are addressed. Students participate in field experiences throughout the semester. *Preq:* ED SP 370.

ED SP 374 Characteristics and Strategies for Individuals with Emotional/Behavioral Disorders 3(3,0) In-depth coverage of characteristics and identification procedures for individuals with emotional or behavioral disorders. Effective instructional strategies and behavior management are addressed. Students participate in field experiences throughout the semester. *Preq:* ED SP 370.

ED SP (PRTM) 414, 614 Recreation and Leisure for Special Populations 3(3,0) See PRTM 414.

ED SP 416 Teaching Internship in Special Education 6(1,15) Full-time, supervised teaching internship in K–12 special education for one semester in cooperation with a participating South Carolina school. Reserved for students seeking certification in critical-need teaching areas. May be repeated for a maximum of 12 credits. To be taken Pass/Fail only. *Preq:* ED SP 371, 491, 493, 494, 496; application approved by department.

ED SP 468 Early Intervention for Infants and Children with Special Needs 3(3,0) Provides students with a working knowledge of the history of early intervention, legal precedence for providing early intervention services, and effective instructional techniques for working with infants and young children with disabilities and their families. *Preq:* ED SP 370, SOC 311.

ED SP 469, 669 Characteristics of Individuals with Emotional and Behavioral Disorders 3(3,0) Addresses the characteristics of individuals with emotional and behavioral disorders. Consideration is given to historical and legal aspects, definitions, comprehensive assessment, and the impact of school, home, culture, and society on individuals with behavior disorders. Research findings in the field of behavior disorders are emphasized. *Preq:* ED SP 370.

ED SP 470, 670 Characteristics of Individuals with Learning Disabilities 3(3,0) Provides specific knowledge of definitions, evaluation procedures, cognitive, social, academic, and functional skills of individuals with learning disabilities across the lifespan. *Preq:* ED F 302, ED SP 370, PSYCH 201, admission to the professional program, or consent of instructor.

ED SP 472, 672 Characteristics of Individuals with Mental Retardation 3(3,0) Characteristics of mental retardation across the lifespan: learning, behavioral, and developmental aspects are examined. *Preq:* Admission to the professional program.

ED SP 473, 673 Educational Procedures for Individuals with Mental Retardation 3(3,0) Identification, selection, and preparation of functional curriculum materials and pedagogy for teaching students with mental retardation. A multidisciplinary, student-centered approach to program planning provides the framework. *Preq:* Admission to the professional program.

ED SP 474, 674 Procedures for Individuals with Emotional and Behavioral Disorders 3(3,0) Assists students in developing specific strategies for teaching individuals with emotional and behavioral disorders, utilizing preventive measures, expanding skills in behavior analysis, and implementing the least restrictive intervention warranted. Includes programmatic considerations, social skill instruction, curriculum selection, IEP development, and effective transition. *Preq:* ED SP 469.

ED SP 475, 675 Educational Procedures for Individuals with Learning Disabilities 3(3,0) Provides knowledge of educational evaluation and instructional procedures to improve outcomes for individuals with learning disabilities. *Preq:* ED F 302, ED SP 370, PSYCH 201; or consent of instructor.

ED SP 476, 676 Practicum in Learning Disabilities 3(2,3) Addresses content knowledge, skills, and professional values for successful teaching of students with learning disabilities. Focuses on teacher-directed instruction and the use of critical instructional factors, the use of recommended practices for individuals with learning disabilities, and the measurement and anlaysis of student performance data. *Preq:* ED SP 470, 475, completion of student teaching.

ED SP 477, 677 Characteristics of Children Who Are Gifted 3(3,0) Acquaints students with definitions, incidences, characteristics, identification procedures, and curriculum options for the gifted. *Preq:* ED SP 370; minimum grade-point ratio of 2.0.

ED SP 478, 678 Practicum in Emotional and Behavioral Disorders 3(2,3) Addresses content knowledge, performance skills, and professional values for successful teaching of students with emotional and behavioral disorders. Focuses on teacher-directed instruction and the use of critical instructional factors, the use of recommended practice for students with disabilities, and the measurement and analysis of student performance data. *Preq:* ED SP 469, 474, completion of student teaching.

ED SP 479, 679 Practicum in Mental Retardation 3(2,3) Addresses content knowledge, performance skills, and professional values for successful teaching of students with mental retardation. Focuses on teacher-directed instruction and the use of critical instructional factors, the use of recommended practices for students with disabilities, and the measurement and analysis of student performance data. *Preq:* ED SP 370, 472, 473, completion of student teaching.

ED SP 491 Educational Assessment of Individuals with Disabilities 3(3,0) Introduction to assessment process (verification) in special education. Includes procedural safeguards; data collections via informal and standardized procedures; issues in assessment; psychometric properties of standardized tests; and administration, scoring, and interpretation of selected instruments. *Preq:* ED SP 370, 372, 373.

ED SP 492 Mathematics Instruction for Individuals with Mild Disabilities 3(3,0) Prepares students to provide explicit instruction in mathematics for individuals with mild disabilities. Students learn to systematically assess, analyze, and teach math skills. *Preq:* ED SP 370, 372, 373.

ED SP 493 Classroom and Behavior Management for Special Educators 3(3,0) Students describe various intervention strategies for increasing and maintaining appropriate behavior and for decreasing or eliminating inappropriate behaviors. Students accurately recognize, record, and chart inappropriate behaviors; employ the least restrictive intervention; foster self-management skills; and develop preventive strategies and classwide systems for managing academic and social behavior. *Preq:* ED SP 370, 371, 372, 373, 374, or consent of instructor.

ED SP 494 Teaching Reading to Students with Mild Disabilities 3(3,0) Emphasizes the knowledge and skills necessary for teaching reading to students with mild disabilities. *Preq:* ED SP 371, ED 498, or consent of instructor; concurrent enrollment in ED SP 491, 492, 493, 496; admission to the professional program.

ED SP 495 Communication and Collaboration for the Resource Teacher 3(3,0) [W.3] Focuses on the development of written communication skills to enhance special education teachers' collaboration with parents, regular educators, public and private agencies. *Preq:* ED SP 491, 492, 493, 494, 496; concurrent enrollment in ED SP 416 or 498.

ED SP 496 Special Education Field Experience 3(0,9) Supervised practical experience prior to Directed Teaching for preservice special education teachers preparing to teach individuals with mild/moderate disabilities. *Preq:* ED SP 370, 371, 372, 373, 374, or consent of instructor.

ED SP 497 Secondary Methods for Individuals with Disabilities 3(3,0) Preparation for working with students with mild/moderate disabilities in secondary schools. Focus is on literature, methods, and materials for providing instruction in transition, self-determination, knowledge within content areas, functional skills, and integration into the community. *Preq:* Seventh semester, admission to the professional program.

ED SP 498 Directed Teaching in Special Education 12(1,33) Comprehensive course providing a full-time, semester-long experience for preservice special education teachers who plan to teach individuals with mild/moderate disabilities. Generally the last course in the program; provides teaching experience under the supervision of University and school personnel. *Preq:* ED SP 491, 492, 493, 494, 496, or consent of instructor.

SPEECH

Associate Professors: L. J. Eastland, *Interim Chair;* D. S. Geddes; *Assistant Professors:* A. C. Billings, B. E. Denham, K. K. Halone, M. B. Hovind, S. J. Madden; *Instructors:* J. W. Birdnow, C. O. Bishop; *Lecturers:* A. C. Billings, D. C. Burke, P. C. Cifatte, M. H. Dehner, R. R. Mascaro, C. S. Parsons, R. E. Roberts, R. Singh, E. R. Smith, R. D. Stafford; *Visiting Assistant Professors:* J. E. Egbunike, N. S. Jackson

SPCH 150 Introduction to Speech Communication 3(3,0) [O.3] Overview of theoretical approaches to the study of communication, including the theory and practice of interpersonal/small group/intercultural/public communication.

SPCH 162 Forensic Laboratory 1(0,3) Research, preparation, and practice leading to participation in on-campus and intercollegiate debate and individual events competition. May be repeated for a maximum of four credits.

SPCH 163 Advanced Forensic Laboratory 1(0,3) Advanced research, preparation, and practice leading to continued participation in on-campus and intercollegiate debate and individual events competition. May be repeated for a maximum of four credits. *Preq:* SPCH 162.

SPCH 201 Introduction to Communication Studies 3(3,0) Introduces and prepares students for continued study in their major by familiarizing them with the evolution of the communication discipline. Students are exposed to those major theoretical approaches and traditional research practices that characterize contemporary communication scholarship.

SPCH 250, H250 Public Speaking 3(3,0) [O.3] Practical instruction in public speaking; practice in the preparation, delivery, and criticism of short speeches. Develops an understanding and knowledge of the process of communication.

SPCH 251 Business and Professional Speaking 3(3,0) [O.3] Skills-intensive course for researching, organizing, and delivering speeches for business and professional settings.

SPCH 256 Introduction to Public Relations 3(3,0) Students learn the context and techniques of public relations (PR), a form of corporate communications. Types of PR work, theories of PR, the four-part structure of PR, and the history of the field.

SPCH 268 Voice and Diction 3(3,0) Practical work to improve vocal clarity and tonal quality of students' speech. Corrects such voice and diction problems as improper enunciation and extreme dialects.

SPCH 300 Communication in a World Context 3(3,0) In-depth examination of differences in communication practices and meanings seen through a global perspective. *Preq:* SPCH 150, 250, or consent of instructor.

SPCH 301 Speech Communication Theories 3(3,0) Various theories and models of communication characterizing the field of speech communication. Focuses on how communication is conceptualized from different theoretical perspectives.

SPCH 302 Mass Communication Theory 3(3,0) Survey of the breadth and history of theories of mass communication and mass media from the 19th century to the present. Especially emphasizes contemporary schools of thought, theoretical debates, and the continuing controversies in the field.

SPCH 310 Communication Research Methods 3(3,0) Students study methods of communication research, preparing research projects, conducting research studies, ethnography, observation, sampling, measurement, analysis, and the relationship between theory and research.

SPCH 320 Television Journalism 3(3,0) Explores both the philosophy of journalism and the applied skills of the journalist. In addition to classroom activities, students experience television journalism first-hand as participants on a weekly on-campus television news program.

SPCH 325 Sports Communication 3(3,0) Fundamentals of communicating in a sports environment. The basics of communicating for print and broadcast news, as well as communicating for public relations and sports information. Ethical considerations and the role of sports in American culture are covered. *Preq:* SPCH 201.

SPCH 330 Nonverbal Communication 3(3,0) Develops a knowledge of the functions of nonverbal behaviors in human interaction. This includes the study of gesture and movement, physical appearance, vocal behavior, immediacy, time and space, and intercultural differences. Promotes understanding of nonverbal rules.

SPCH 340 Negotiations Communication 3(3,0) Develops a knowledge of the basic strategies and elements of communication used in effective negotiation. Includes techniques of dealing with people, interests, options, and the criteria necessary to reach agreements and objectives.

SPCH 348 Interpersonal Communication 3(3,0) Survey of the theories and research in interpersonal communication with emphasis on the application of research findings and developmental strategies for intra- and inter-cultural relationships.

SPCH 349 Communication and Aging 3(3,0) Major theories and concepts concerning communication with and between members of aging populations. Focus on communication factors that affect the elderly and implication for the creation and maintenance of satisfying relationships within and between generations.

SPCH 350 Small Group and Team Communication 3(3,0) Examines the principles and skills involved in effective small-group communication.

SPCH 356 Stakeholder Communication 3(3,0) Focuses on external stakeholders such as the media, the community, and the government. Students learn how to manage various stakeholder relationships. *Preq:* Junior standing.

SPCH 360 Persuasion 3(3,0) Theories of persuasion and propaganda. Practical instruction in analysis and construction of persuasive messages. *Preq:* SPCH 250.

SPCH 361 Argumentation and Debate 3(3,0) Basic principles of argumentation with emphasis on developing skills in argumentative speech. The role of the advocate in contemporary society with an emphasis on and an appreciation of formal debate. *Preq:* Consent of instructor.

SPCH 362 Organizational Communication Simulation 3(3,0) Students develop and apply communication skills which are useful in a variety of organizational settings: taking and conducting interviews, group decision making, and oral reporting. Discusses communication processes and provides personal and professional development. *Preq:* SPCH 250 or consent of instructor.

SPCH 363 Oral Interpretation of Literature 3(3,0) Analysis and oral interpretation of selected poetry and prose; training in development of effective tone production.

SPCH 364 Organizational Communication 3(3,0) Examination of the process, theories, and techniques of communications within small groups and other organized bodies.

SPCH 365 Mass Communication: History and Criticism 3(3,0) Critical examination of mass communication in America, including discussions of history, theory, and current issues in television, film, popular music, telecommunications, and other media.

SPCH 366 Special Topics in Speech 3(3,0) Consideration of select major areas of study in speech. May be repeated for a maximum of 15 credits with consent of department chair.

SPCH 369 Political Communication 3(3,0) Examination of American political rhetoric after 1900, focusing on such notable speakers as Franklin D. Roosevelt, John F. Kennedy, and Martin Luther King, Jr.

SPCH 390 Speech and Communication Studies Internship 3(0,9) Preplanned, preapproved, faculty supervised internship provides Speech and Communication Studies majors with field experience in areas related to their curriculum. May be repeated for a maximum of six credits. To be taken Pass/Fail only. *Preq:* Junior standing, consent of faculty advisor.

SPCH (LANG) 400 Phonetics 3(3,0) See LANG 400.

SPCH 455 Gender Communication 3(3,0) Explores the ways communication behavior and perceptions of communication behavior are affected by gender. The effects of gender on a variety of communication contexts are examined, including interpersonal, small group, organizational, and mass communication.

SPCH 456, 656 Crisis Communication 3(3,0) In-depth examination of the use of communication in planning, managing, and responding to organizational crisis. *Preq:* Senior standing or consent of instructor.

SPCH 460 Communication and Conflict Management 3(3,0) Introduces the study of communication practices in conflict situations within various personal and professional settings. Emphasis is on the central role of communication in the understanding and management of conflict. *Preq:* SPCH 150 or 250 or consent of instructor.

SPCH 464, 664 Advanced Organizational Communication 3(3,0) Application of speech communication methodology to the analysis of organizational communication processes. Students study methods of organizational communication analysis and intervention. *Preq:* SPCH 364 or consent of instructor.

SPCH 470, 670 Communication and Health 3(3,0) Considers institutional and healthcare communication issues as well as the relationship between social issues, communication, and health.

SPCH 480 Intercultural Communication 3(3,0) Introduces the process of communication between and among individuals from different cultures or subcultures. Emphasis is on the effect of cultural practices within various communication relational contexts such as interpersonal, small group, and organizational communication. *Preq:* SPCH 150 or 250 or consent of instructor.

SPCH (ENGL) 491, 691 Classical Rhetoric 3(3,0) See ENGL 491.

SPCH (ENGL) 492, 692 Modern Rhetoric 3(3,0) See ENGL 492.

SPCH 495 Senior Communication Seminar 3(3,0) Students apply their knowledge and education to a significant research project involving the student's communication research interest. Project(s) culminate in a written document and a public presentation/discussion of the student's research. *Preq:* Senior standing in Speech and Communication Studies; consent of instructor.

SPCH 499 Independent Study 1-3(1-3,0) Tutorial work for students with special interests or projects in speech communication outside the scope of existing courses. *Preq:* Consent of the department chair.

TECHNOLOGY AND HUMAN RESOURCE DEVELOPMENT

Professors: W. L. Havice, C. H. Isbell, G. G. Lovedahl, *Chair;* W. D. Paige, D. G. Tesolowski; *Associate Professors:* C. C. Linnell, C. D. Schmittou; *Assistant Professor:* J. B. Simmons; *Visiting Instructor:* W. B. Doty

THRD 110 Introduction to Industrial Technology 3(3,0) Examines the philosophy and structure of industrial technology education in the public school system and the philosophy and organization of human resource development in industry. Students are given an orientation to a major in Technology and Human Resource Development and an overview of the principles of technology.

THRD 130 Woodworking I 2(1,3) Study of wood, its properties, and the requisite skills necessary for understanding the use of wood in our technological way of life.

THRD 160 Training Programs in Industry 3(3,0) Introduction and first-hand experience in industrial training programs. Emphasis is on observing and participating in actual training situations as well as communications and media usage in industry. *Preq:* THRD 110.

THRD 180 Introduction to Technical Drawing and Computer-Aided Drafting 3(1,6) Introductory drafting course utilizing traditional drafting techniques and computer software to explore technical drawing and orthographic projection through construction of multiview and isometic projections, sectional and auxiliary views, dimensioned working drawings, developments, and intersections. Freehand sketching is a means of problem solving and analysis.

THRD 181 Advanced Technical Drawing and Computer-Aided Drafting 3(1,6) Students expand the application of computer-aided drafting in the areas of mechanical and architectural drawing. Emphasis is on development of complete working drawings incorporating instruction in the areas of production, manufacturing, and construction. *Preq:* THRD 110, 180 or equivalent; consent of instructor.

THRD 220 Manufacturing Technology I: Systems 3(2,3) Introduction to management, personnel, and production systems studies through the creation of a corporation. Includes product identification, product research and design, selection of processes, plant design, production systems, and system enhancement. *Preq:* THRD 110 or consent of instructor.

THRD 222 Metal Processes 3(2,3) Material separating, forming, and combining practices in the metals industries through the study of basic casting, welding, and sheet-metal techniques.

THRD 224 Machine Tool Processes 3(2,3) Basic practical shop experiences on the lathe, drill press, milling machine, and shaper. Benchwork, measuring tools, theory, and demonstrations related to a survey of fundamental machining practices.

THRD 230 Construction Technology I: Materials 3(2,3) Introduction to the commonly used building materials and methods of combining them in present day construction. *Preq:* THRD 110 or consent of instructor.

THRD 240 Power Technology I: Production 3(2,3) Study of power in terms of energy sources and the generation of power. Emphasis is on the development of insights and understandings of the scientific and operational principles involved in the production and utilization of power. *Preq:* THRD 110 or consent of instructor.

THRD 250 Electricity 3(2,3) Theory and application of DC and AC fundamentals, including instrumentation, power sources, circuit analysis, motors, construction wiring, and electronic principles and components.

THRD 280 Communications Technology I: Processes and Materials 3(2,3) Topics include graphic communications, photography, computer application and use as a visual communication medium, and audio/video production and application.

THRD 281 Technical Airbrush Illustration 3(1,6) Technical application of airbrush technique. Methods of depicting objects on paper, photograph retouching, sandblasting glass, and fabric decoration are all dealt with, using a single-action airbrush.

THRD 310 Arts and Creativity for the Elementary Child 3(2,3) Provides elementary and early childhood teachers an opportunity to develop technological literacy, art/craft skills in a variety of media, and an understanding of their applications to the curriculum in a classroom environment. *Preq:* Junior standing in Early Childhood or Elementary Education or consent of instructor.

THRD (ED F) 315 Integrating Computers into the Classroom 1(0,2) See ED F 315.

THRD 320 Plastics and Plastic Processes 3(2,3) Introduction to thermoplastic materials, basic processing, fabricating, and finishing operations. Related careers and technological advances are also studied.

THRD 360 Industrial Organizations and Safety 3(3,0) Study of the relationship of training and safety personnel to the kinds of tasks they are asked to perform in industrial situations. Emphasis is on safety knowledge development and on techniques which may be used in industrial safety training.

THRD 370 Motivation and Discipline in Vocational Education 3(3,0) Provides classroom teachers and prospective teachers with knowledge and skills in techniques of student discipline and motivation with application to the occupational education settings.

THRD 371 Management of Industrial Education Laboratories 3(2,2) Management and operation of unit and multiple-activity laboratories, including laboratory design, selection and procurement of tools and equipment, budgeting management, and coordination of activities in laboratory courses.

THRD 390 Industrial Cooperative Experience I 6(0,18)SS Full-time work experience in industry. Students are requested to register with the instructor one semester prior to the summer in which they plan to enroll. *Preq:* Vocational-Technical Education concentration only.

THRD 410, 610 Selected Topics 1-3(1-3,0) Subject areas organized according to program needs. Content is planned cooperatively by the University and the school system or agency requesting the course. May be repeated for a maximum of 18 credits, but only if different topics are covered. *Preq:* Consent of instructor.

THRD 413, 613 Contemporary Technological Problems 3(3,0) Provides students with an understanding of the problems and contributions of technology. Examples of these relationships are taken from historical accounts and from analyses of contemporary technological intervention both in industrialized and nonindustrialized countries.

THRD 415, 615 History and Philosophy of Industrial and Vocational Education 3(3,0) Study of industrial and vocational education programs with the intent of developing a sound individual philosophy of industrial and vocational education. General topics covered are history; local, state, and federal legislation; types of vocational-technical programs; professional organizations; manpower utilization, vocational guidance, and training; industry, labor, and school relationships.

THRD 420, 620 Manufacturing Technology II: Materials and Processes 3(2,3) Continuation of THRD 220 with emphasis on materials and processes of manufacturing. Attention is given to specific materials separating, forming, and combining practices and equipment and on the competitive aspects of manufacturing. *Preq:* THRD 220 or consent of instructor.

THRD 430, 630 Construction Technology II: Practices and Systems 3(2,3) Study of industrial practices and systems affecting man, materials, and equipment associated with construction industries. Activities are directed toward developing a working knowledge of construction technology and a framework for incorporating this instruction into programs in the public and private sectors. *Preq:* THRD 230.

THRD 440, 640 Power Technology II: Transmission and Control Systems 3(2,3) Continuation of THRD 240. Instruction in transmitting and controlling power for utilization in such areas as manufacturing, communications, construction, and transportation. Introduces concepts of automation and robotics to enable the classroom teachers and industry personnel to gain necessary insights into this important area of technology. *Preq:* THRD 240.

THRD 441, 641 Internal Combustion Engines 3(2,3) Study of the internal combustion engine: theory of operation, applications, methods of analyzing performance, and troubleshooting malfunctions. Intended as an elective for Industrial Technology Education and Vocational-Technical Education concentration majors desiring proficiency in this essential area of industrial education. *Preq:* THRD 240 or consent of instructor.

THRD 450, 650 Electronics for Educators 3(1,6) Principles of electronics as applied in communications and automatic controls involving transistors, integrated circuits, and other electronic devices and materials for the preparation of teachers of industrial arts and vocational-technical electricity and electronics. *Preq:* THRD 250 or equivalent.

THRD 460, 660 Developing Training Programs for Industry 3(3,0) Identification, selection, and organization of subject matter for industrial training programs. Emphasizes analysis techniques, session and demonstration planning, written instructional materials development, trainee evaluation, and planning instructional schedules. *Preq:* Senior standing in Human Resource Development concentration or consent of instructor.

THRD 465, 665 Conducting and Evaluating Training Programs for Industry 3(3,0) Basic concepts of supervision, administration, and management of training programs. Emphasis is on determining training requirements, planning, directing, and evaluating training programs. Preq: THRD 160, 460 or consent of instructor.

THRD 468, H468, 668 Public Relations 3(3,0) Emphasizes techniques and methods of effective public and industrial relations which contribute to understanding and cooperation of labor, business, professional, educational, and industrial groups.

THRD 470, 670 Course Organization and Evaluation 3(3,0) Problems, techniques, and procedures in the preparation, selection, and organization of subject matter for instructional purposes. Methods, techniques, and preparation of materials used in the evaluation of student achievement in industrial education subjects.

THRD 471, 671 Teaching Industrial Subjects 3(3,0) Effective methods and techniques of teaching industrial subjects. Emphasis is given to class organization, preparation of lesson outlines, and audio-visual aids. *Preq:* ED F 335.

THRD 472 Advanced Instructional Methods 3(3,0) Familiarizes students with the various equipment, materials, and techniques associated with the delivery of instruction. Students design, produce, and present materials to meet specific educational objectives. *Preq:* THRD 471 or one year of teaching experience.

THRD 473, 673 Competency Testing in Vocational Subjects 3(3,0) Study of competency testing in vocational education which includes educational objectives and measurement; construction and use of oral, objective, short answer, matching, essay, and performance tests; and treatment of test data for grade assignments and statistical analysis.

THRD 474, 674 School Safety 3(3,0) Study of the principles of school safety emphasizing safety analyses, accident prevention, remediation of unsafe conditions, development and use of instructional materials, and school liability.

THRD 477 Directed Teaching 12(0,36) Supervised observation and teaching in cooperation with selected public schools in which opportunities are provided for securing experience in teaching industrial subjects. *Preq:* THRD 371, 471, 2.0 cumulative grade-point ratio.

THRD 478 Internship in Vocational Technical Education I 6(0,18) Supervised observation and teaching in cooperation with selected area vocational centers, high schools, and technical colleges to provide experience in teaching specified trades and industrial subjects. *Preq:* THRD 371, consent of instructor.

THRD 479 Internship in Vocational Technical Education II 6(0,18) Continuation of THRD 478. *Preq:* THRD 478, consent of instructor.

THRD (AG ED, ED F) 480, 680 Educational Applications of Microcomputers 3(2,2) [C.3] See ED F 480.

THRD (AG ED, ED F) 482, 682 Advanced Educational Applications of Microcomputers 3(2,2) See ED F 482.

THRD 483, 683 Architectural Drafting for Industrial Education 3(1,6) Study of the major aspects of architectural drawing, such as plot, floor, and foundation plans; wall sections; and elevations. *Preq:* THRD 180.

THRD 484, 684 Communications Technology II: Systems 3(2,2) Continuation of THRD 280. Includes theory and operation of communications systems: telegraph, telephone, radio, television, satellites, sound/video recorders, lasers, and computers. Instruction on strategies for interpreting this area of technology to industry personnel and public school students is emphasized. *Preq:* THRD 280.

THRD 486, 686 Instructional Media Development 3(1,4) Basic instructional media development techniques are presented. Students develop material using authoring software such as HyperCard, transparencies using Persuasion and/or Powerpoint, and fully storyboarded, scripted, and edited digital as well as analog video.

THRD 490 Industrial Cooperative Experience II 6(0,18) Continuation of THRD 390. *Preq:* Vocational-Technical Education concentration only.

THRD 491 Special Projects 3(3,0) Students are assigned projects in accordance with their needs and capabilities. Projects are either experimental, theoretical, or developmental and cover subjects not thoroughly covered in other courses. Written project approval required before registering. *Preq:* Consent of instructor.

THRD 492, 692 Advanced Projects 1-6 Students gain depth in content by completing projects under the supervision of an instructor in one of the following subject areas: arts and crafts, drawing and design, electricity and electronics, graphic arts, metalworking, occupational education, power, and woodworking; written project approval required before registering. May be repeated twice for a maximum of six credits. *Preq:* Consent of instructor.

TEXTILE CHEMISTRY

Professors: J. R. Aspland, H. M. Behery, M. J. Drews, M. S. Ellison, B. C. Goswami, R. V. Gregory, *Director*; C. W. Jarvis, D. V. Rippy, C. D. Rogers, E. A. Vaughn; *Associate Professor:* G. C. Lickfield; *Assistant Professor:* S. Foulger

T C 303 Textile Chemistry 3(3,0) Study of the properties and reactions of aliphatic and aromatic organic compounds. Emphasis is placed on mechanistic interpretations and the development of synthetic schemes leading to polyfunctional compounds of the types encountered in the textile industry. *Preq:* CH 102. *Coreq:* MTHSC 206 or 207.

T C 304 Textile Chemistry 3(3,0) Fundamental principles of physical chemistry with emphasis on areas frequently encountered in the textile industry including thermodynamics, kinetics, and solution properties. These concepts are applied to the study of organic compounds and organic reaction mechanisms. *Preq:* T C 303.

T C 305 Textile Chemistry Laboratory 1(0,3) Introduction to techniques used in synthesis and characterization of organic compounds. *Coreq:* T C 303.

T C 306 Textile Chemistry Laboratory 1(0,3) Techniques used in the measurement of the physiochemical properties of polymers and textile chemicals. *Coreq:* T C 304.

T C 405 Principles of Textile Printing 3(2,3) Development of modern textile printing systems is studied. In addition, colloidal requirements of colorants, thickener compositions, rheology of printing pastes, and various physical requirements necessary for a successful printing system in a modern plant are examined. *Preq:* Consent of instructor.

T C 406 Textile Finishing—Theory and Practice 3(2,3) Study of the application of chemicals to textile substrates and how they affect the substrate's physical and chemical properties. Emphasizes the theories of chemical modification of textiles as well as the technology of finishing.

T C 415, H415, 615 Introduction to Polymer Science and Engineering 3(3,0) Chemistry of monomers and polymers and the chemical and physical properties of polymers are discussed emphasizing fiber forming, synthetic polymers. Includes molecular characterization, structure, morphology, and mechanical properties as they relate to the design of polymer systems for end uses in textiles, geotextiles, plastics and fiber-reinforced composite materials. *Preq:* CH 201 and 330 or 224, T C 304, or consent of instructor.

T C 416, 616 Chemical Preparation of Textiles 3(2,3) Chemicals used in the preparation of fabric for dyeing and finishing. Oxidizing and reducing agents and their control and effect on various fibers. Collodial and surface active properties of various compounds and the fundamental factors influencing these properties.

T C 417 Polymer and Fiber Laboratory 1(0,3) High molecular weight polymers are prepared from monomers, and their chemical and physical properties are measured as functions of critical end use parameters using instrumental and physical methods. *Coreq:* T C 415.

T C 457, H457, 657 Dyeing and Finishing I 3(3,0) Understanding of the physical, chemical, and mechanical principles behind the application of colors and finishes to textiles. Requires an appreciation of fiber chemistry and morphology, dye and finish structures and reactivity and mechanical principles behind equipment used to effect transfer of these chemicals onto the textile substrate.

T C 458, H458, 658 Dyeing and Finishing II 3(3,0) Kinetics and equilibria of dyeing processes. The use of conductivity, diffusion, and other methods useful for measuring absorption of isotherms and dyeing rates and the general thermodynamic relationships applicable to dyeing operations. Fiber properties such as zeta potential, dye sites, relative amorphous area available are included.

T C 459 Dyeing and Finishing Laboratory I 1(0,3) Introduces students to common dyeing and printing methods and to some of the machinery necessary to carry out dyeing operations. *Coreq:* T C 457.

T C 460 Dyeing and Finishing Laboratory II 1(0,3) Covers finishing in addition to dyeing operations and their instrumental control. *Coreq:* T C 458.

TEXTILE MANAGEMENT

Professors: J. R. Aspland, H. M. Behery, M. J. Drews, M. S. Ellison, B. C. Goswami, R. V. Gregory, *Director;* C. W. Jarvis, D. V. Rippy, C. D. Rogers, E. A. Vaughn; *Associate Professor:* G. C. Lickfield; *Assistant Professor:* S. Foulger

TEXT 175 Introduction to Textile Manufacturing 3(3,0) Introduction to the broad fields of textile, fiber, and polymer science and engineering with emphasis on the scientific, technological, and business principles utilized in producing fibers, yarns, and fabrics; enhancing fabric functionality by dyeing, finishing, and printing; and establishing end-use products.

TEXT 176 Natural and Man-made Fibers 4(3,3) Concept of natural and synthetic polymers as the raw materials of the textile industry is introduced. Survey of the origin, characteristics, and processing properties of various natural fibers and fiber-forming synthetic polymers. Formation of textile fibers from polymeric materials is presented with specific emphasis on the polymer science and engineering principles.

TEXT 201 Yarn Structures and Formation 4(3,3) Study of fiber processing systems required to transform various fibrous materials into yarn. Involves the machine principles and theories, relationship of the fibers to the process and the resultant yarn structures, and subsequent analysis of the yarn structure to define quality and to determine suitable manufacturing practices. *Preq:* TEXT 175 and 176 or consent of instructor.

TEXT 202 Fabric Structures, Design, and Analysis 4(3,3) Study of fabric formation techniques designed to explore the principles and theories of modern technology. Evaluation and analysis of weaving, knitting, and nonwoven fabrication of textile structures. *Preq:* TEXT 201 or consent of instructor.

TEXT 301 Fiber Processing I 3(2,2) Study of fibrous materials and their relationships to the fiber processing systems. The objectives, theories, principles, and mechanisms of the machines used in the earlier stages of fiber processing. Directed primarily to the staple fiber processing systems. Mechanical and mathematical fundamentals are applied to the machines concerned.

TEXT 302 Fiber Processing II 3(2,2) Continuation of TEXT 301 emphasizing the later stages of fiber processing for the ultimate yarn strand. *Preq:* TEXT 301.

TEXT 308 Apparel 4(3,3) Introduction to apparel construction techniques and analysis of problems commonly encountered in the apparel industry. Evaluation of fabric design and properties. *Preq:* TEXT 202 or consent of instructor.

TEXT 311 Fabric Development I 3(2,2) Study of the basic theory of the cam loom weaving machine. Principles of designs of basic plain, twill, and sateen fabric, and other weaves such as honeycomb, mock leno, and hucka-back weave. Weave analysis and preparation of necessary drafts are included.

TEXT 312 Fabric Development II 3(2,2) Study of the theory and operation of the dobby head, Knowles head, Staubli dobby, Jacquard head, and multicolor selection for the above looms. Weave design for compound fabrics using two or more systems of warp and filling threads for three-dimensional weaves, weave analysis, and preparation of drafts are covered. *Preq:* TEXT 311.

TEXT 314 Chemical Processing of Textiles 4(3,2) Concepts of current procedures in the chemical, mechanical, and physical preparation and in bleaching, dyeing, printing, and finishing of fabrics are presented; colorimetric and spectrophotometric methods of color control and test methods for the evaluation of the effectiveness of the treatments are emphasized. Not open to Polymer and Textile Chemistry or Textile Management (Chemical) majors.

TEXT 324 Textile Statistics 3(3,0) Introduction to statistics with particular application to the textile industry. Measures of central value and variation, probability, the normal curve, tests of hypotheses, elementary correlation, and regression. *Preq:* Sophomore standing or consent of instructor.

TEXT 333 The Textile Arts 3(2,3) Surveys development of the hand loom from prehistoric times to the present. Studio work in the elements of handwoven fabrics, their design, analysis and production of four-harness counterbalance and jack looms. *Preq:* Junior standing or consent of instructor.

TEXT 403 Fiber Processing III 3(2,2) Concepts of current fiber processing machines, techniques, practices, and their validity are investigated. Problems are assigned that require use of acquired knowledge, textile testing equipment, and processing machines. The relation of fibrous material properties and processing dynamics to the fiber assemblies produced is studied. *Preq:* TEXT 201 or 302.

TEXT 411 Fabric Development III 3(2,2) Study of specifications and loom details for the production of fabrics woven to the customer's order, including multicolor layouts. Warp and filling preparation are covered as well as size formulations and their methods of application. Warping and dressing plans are developed for the warper and the slasher. *Preq:* TEXT 202 or 312.

TEXT 414 Knitted Structures 3(3,0) Survey of knitted structures dealing with the principles and mechanisms involved. Various systems are covered with emphasis on fiber and yarn requirements and fabric properties.

TEXT 416 Nonwoven Structures 3(2,2) Nonwoven fabric structures, their manufacture, properties, and applications. Methods of nonwoven fabric formation, resultant material characteristics and end-use applications are examined. *Preq:* TEXT 201 or 301.

TEXT 421, H421, 621 Fiber Science 3(2,2) Familiarizes students with the physical properties of textile and high performance fibers and how these properties influence process and end-use performance; method of measuring those properties; and how those properties are related to structural features of the fiber.

TEXT 422, 622 Properties of Textile Structures 3(2,2) Yarn and fabric properties, their scientific significance and analysis. Dimensional, structural, and mechanical interrelationships are established and evaluated.

TEXT 426, 626 Instrumentation 3(3,0) Principles of industrial and process instrumentation and control as applied in the textile industry; static and dynamic characteristics of measurement devices; transducer principles and techniques of their application for measurement of physical properties such as pressure, temperature, flow, weight, etc.; principles of process controllers; applications of computers in textile process control.

TEXT 428 Textile Research 1-3 Investigation of a problem in textile, fiber, or polymer science under the direct supervision of a faculty member. After completing the research, student prepares a formal written report which is presented orally. *Preq:* Senior standing or consent of instructor.

TEXT 429 Textile Research 1-3 Continuation of TEXT 428.

TEXT 440 Color Science 3(2,3) Application of the science of color to industrial practice in textiles, plastics, paints, lighting, and ceramics. Laboratory work is performed on modern instruments and computers.

TEXT 445, 645 Special Topics in Textile, Fiber, and Polymer Science 1-3(1-3,0) Special topics in textile, fiber, and polymer sciences. A co-enrollment course for similar courses in other departments such as for those students involved in CAEFF projects and CH E 445. There may be different sections in a term to cover different topics. May be repeated for a maximum of nine credits, but only if different topics are covered. *Preq:* Consent of instructor.

TEXT 460, 660 Textile Processes 3(3,0) Survey of machinery and processes of textile manufacturing from fiber formation through fabric finishing. For students with a nontextile background.

TEXT 470 Textile Costing and Inventory Control 3(3,0) Study of the principles of costing as they specifically apply to the manufacture of textiles. Allocation of cost of material, labor, and overhead: determining the unit cost of yarns, fabrics, and finishes. Inventory systems, storage, materials handling, and profiles. *Preq:* TEXT 202 or consent of instructor.

TEXT 471 Plant Layout and Processing Design 3(3,0) Survey of the essentials necessary for textile process implementation from the pilot plant concept to a functioning textile process facility. Material flow requirements, power requirements, machinery layout, environmental controls, and facility design are considered. *Preq:* TEXT 202.

TEXT 472, 672 Textile International Trade 3(3,0) Analyzes the current structure of the international textile trade including imports, exports, tariffs, and trade requirements. Field experience with local firms is used to enhance the student's understanding. *Preq:* Senior standing or consent of instructor.

TEXT 475, 675 Textile Marketing 3(3,0) Examination of the activities involved in the distribution of textile products in today's market. Emphasis is placed on the role of consumer research and the analysis of fashion in the design and promotion of textile products.

TEXT 476, 676 Carpet Manufacturing 3(3,0) Study of the materials, manufacturing technologies, products, and practices associated with the carpet manufacturing sector of the textile industry. Raw materials, product design, formation and finishing systems, evaluation methods, distribution, and end-use applications are examined. *Preq:* TEXT 201, 202, or consent of instructor.

THEATRE

Professors: C. S. M. Egan, R. C. Sawyer; *Associate Professor:* D. J. Hartmann; *Assistant Professors:* H. Currie, V. M. Vactor; *Lecturer:* J. L. Franzese

THEA 210, H210 Theatre Appreciation 3(3,0) Examination of the theatre event approached through historical context, play reading, analysis of production practices, and field trips to live dramatic performances.

THEA 267 Stage Makeup Techniques 3(2,1) Practical study of basic stage makeup techniques for the acting student including corrective makeup, modeling with paint, three-dimensional makeup, prosthesis with latex, and makeup for other media.

THEA 278 Acting I 3(2,3) Fundamentals of acting; basic stage techniques; exercises in interpretation, improvisation, characterization; experience in supervised scene study.

THEA 279 Theatre Laboratory 1(0,3) Practical work in theatre on a production designed for public presentation. May be repeated for a maximum of four credits.

THEA 315 Theatre History I (3,0) Historical survey of Western theatre; emphasis is placed on the changing roles of the playwright, director, actor, technician, and spectator from antiquity to the Renaissance. *Preq:* Sophomore standing.

THEA 316 Theatre History II 3(3,0) Historical survey of Western theatre; emphasis is placed on the changing roles of the playwright, director, actor, technician, and spectator from the Renaissance to the present. *Preq:* Sophomore standing.

THEA 317 African American Theatre 3(3,0) Acquaints students with the origin and development of African American playwrights, plays, players, and their contributions to the American theatre from the 19th century to the present.

THEA (ENGL) 347 The Structure of Drama 3(3,0) Introduction to the creative writing and critical study of drama. *Preq:* Sophomore literature or consent of instructor.

THEA 368 Voice for the Stage 3(2,3) Study of the principles of vocal production and standard American speech for the stage; exercises in breath support and projection, improving tonal quality, and elimination of regional dialects through the study of the International Phonetic Alphabet. *Preq:* Sophomore standing.

THEA 372 Creative Drama 3(3,0) Practical applications using creative drama as a learning tool to strengthen curriculum goals and heighten student participation in the classroom. Students develop classroom teaching strategies based on drama education. Appropriate for elementary and secondary teachers, artists, and workshop leaders.

THEA 374 Stage Movement for Actors 3(1,2) Study of the psychological and physical sources of movement in the human body, with emphasis on the attainment of intellectual and physical control and the application of the skills to the development of a role.

THEA 376 Stage Directing I 3(2,3) Directing and staging techniques for the proscenium stage; exercises in composition, movement, picturization; experience in direction of scenes. *Preq:* Sophomore standing.

THEA 377 Stagecraft 3(2,3) Theory and practice of stage design and technology. *Preq:* Sophomore standing.

THEA 379 Acting Ensemble 1(0,3) Performance opportunities in the area of theatre for young audiences. Students are members of a theatrical touring troupe and perform in a variety of spaces and locations. May be repeated for a maximum of four credits. By audition only.

THEA 398 Special Topics in Theatre 3(3,0) Select areas of study in theatre not addressed by other theatre course offerings. May be repeated once. *Preq:* Consent of instructor.

THEA (ENGL) 447 Playwriting Workshop 3(0,3) Workshop in the creative writing of plays. May be repeated once. *Preq:* THEA (ENGL) 347.

THEA 472, 672 Improvisation: Interpreting and Developing Texts 3(3,0) Practical applications using drama as a learning tool to strengthen writing skills, motivate collaboration, heighten analytical skills. Students use improvisation to analyze texts and to revise original work, consider theory and research of contemporary scholars, and develop approaches to literature and composition based on readings and drama experiences. *Preq:* Senior standing or consent of instructor.

THEA 476 Stage Directing II 3(2,3) Continued study in the art of stage directing, emphasizing leading contemporary theory and methodology. Culminates in the production of a one-act play for public presentation. *Preq:* THEA 376 or consent of instructor.

THEA 477 Stage Design 3(2,3) Study and practice in stage design, including drafting, graphics, drawing, rendering, scene painting, and light plotting. *Preq:* THEA 377 or consent of instructor.

THEA 479 Acting II 3(2,3) Continued study in the craft of acting for contemporary Western theatre. Students focus on monologue and scene study in a variety of performance settings. *Preq:* THEA 375 or consent of instructor.

THEA 487, 687 Stage Lighting 3(2,1) Theory and practice of stage lighting through an understanding of various lighting instruments, lighting control systems, and execution of lighting designs.

THEA 497, 697 Scene Painting 3(2,1) Practical study of basic painting techniques for the theatre including layout, proper use of materials, painting styles, and texturing techniques.

THEA 499, 699 Independent Studies 1-3(1-3,0) Tutorial work for students with special interests outside the scope of existing courses. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

WILDLIFE AND FISHERIES BIOLOGY

Professors: A. G. Eversole, T. T. Fendley, J. W. Foltz, J. J. Isely, D. L. Otis, T. E. Schwedler, J. R. Sweeney, *Chair;* J. R. Tomasso, Jr., G. W. Wood; *Assistant Professor:* C. R. Allen

W F B 101 Introduction to Aquaculture, Fisheries, and Wildlife 1(1,0)F Informative sketch of aquaculture, fisheries science, and wildlife management. Students are introduced to principles, resources, professional organizations, and careers in these fields. *Preq:* Major in Aquaculture, Fisheries, and Wildlife Biology or consent of instructor.

W F B 102 Methods of Aquaculture, Fisheries, and Wildlife Biology 1(0,2)F Introduction to methodology used in aquaculture, fisheries science, and wildlife management. Students are introduced to terminology, techniques, laws, and legislations. Skills with dimensions, units, computations, and technical communications as applied to aquaculture, fisheries, and wildlife. Open only to Aquaculture, Fisheries, and Wildlife Biology majors. *Coreq:* W F B 101.

W F B 300 Wildlife Biology 3(3,0) Natural history, biology, and conservation of wildlife managed by natural resource agencies. Attention is given to those factors important in the management and conservation including species distribution and abundance, habitat requirements, and life-history characteristics. Principles and problems associated with conservation of selected wildlife species are covered. *Preq:* Two semesters of introductory biology.

W F B 306 Introduction to Wildlife Conservation 2(2,0)F, S Examines the fundamental thinking upon which modern conservation programs have been built.

W F B 307 Hunting and Wildlife Management 1(1,0)S Hunting techniques used to harvest renewable wildlife resources are examined with respect to their roles in sound management practices. The effects of selected hunting regulations on wild populations, safety, and ethics are discussed. *Preq:* Junior standing or consent of instructor.

W F B (BIOSC) 313 Conservation Biology 3(3,0) Study of the biological bases for the conservation of flora, fauna, and habitats. Biological factors that influence decision-making process are also addressed. *Preq:* One year of general biology or consent of instructor.

W F B 350 Principles of Fish and Wildlife Biology 3(3,0)F Introduction to principles of fisheries and wildlife biology on which sound management practices are based. Interrelationships of vertebrate and invertebrate biology, habitat, and population dynamics are covered. *Preq:* One year of general biology.

W F B 412, H412, 612 Wildlife Management 3(2,3)S Basic principles and general practices of wildlife management and conservation are covered. Major problems concerning the management of wildlife resources, with emphasis on upland game species. Laboratory work includes practical work on the Clemson University woodlands and field trips to several areas where wildlife management is being practiced.

W F B 414, 614 Wildlife Nutritional Ecology 3(3,0)S Concepts of how terrestrial wildlife obtains and utilizes energy and nutrients in wild ecosystems are taught. Energy and nutrient availability are discussed in the ecological context of distribution, flow, and cycling in natural and modified foraging areas. Physiology of digestion is discussed for major homeotherms. *Preq:* FOR 415 or W F B 412.

W F B 416, 616 Fishery Biology 3(2,3)F Principles underlying freshwater fish production. Introduction to major groups of freshwater fishes and their habitats. Topics include identification, age and growth, fecundity, food habits, populations estimation, environmental evaluation, management practices, and fish culture. *Preq:* One year of introductory biology, Junior standing.

W F B 418 Fishery Conservation 3(3,0) Survey of conservation efforts directed toward freshwater and marine fisheries resources. Topics include threatened, endangered, over-exploited species and introductions of exotic species. *Preq:* Two semesters of introductory biology.

W F B 430, 630 Wildlife Conservation Policy 3(3,0)F Deals with the ecological rationale and management implications of public policy designed for the conservation of American wildlife resources. Emphasis is on managed-land issues. *Preq:* W F B 350 or permission of the instructor.

W F B 440 Non-game Wildlife Management 3(3,0) Basic principles and general practices of non-game wildlife management are covered. Emphasis is placed on those principles and practices most appropriately used by state agencies in their management programs for non-game species, along with real-world problems associated with implementation of such programs. *Preq:* Two semesters of introductory biology.

W F B 450, 650 Aquaculture 3(3,0) Basic aquacultural techniques applied to freshwater and marine organisms; past and present culture of finfishes and shellfishes around the world; principles underlying fish production; water quality, feeding, and nutrition as they influence production of cultured aquatic organisms. *Preq:* One year of general biology, Junior standing.

W F B 460, 660 Warmwater Fish Diseases 2(2,0) Study of diseases in warmwater fish including infectious and noninfectious processes. *Preq:* One year of general biology, Junior standing, consent of instructor.

W F B 462, H462, 662 Wetland Wildlife Biology 3(3,0)F Study of wetland wildlife habitats, emphasizing classification by physical, chemical, and biological characteristics; importance of wetland habitat for management and production of wetland wildlife species. *Preq:* BIOL 103/104 or 110/111.

W F B 463 Directed Research in Aquaculture, Fisheries, and Wildlife Biology 1(0,3)F, S Research problems in selected areas of aquacultural, fisheries, or wildlife science to introduce students to experimental design, research techniques, and presentation of research results. May be repeated for a maximum of three credits. *Preq:* Junior standing, consent of instructor.

W F B (ENT) 469, H469, 669 Aquatic Insects 3(1,6) See ENT 469.

W F B 490 Field Training in Aquaculture, Fisheries, and Wildlife 6(0,18)F, S Eight-to-ten-week program in which students observe aquaculture, fisheries, or wildlife management. Students have supervised management responsibility. Total of 270 hours required. Must be arranged at least two months in advance. To be taken Pass/Fail only. *Preq:* Senior standing in Aquaculture, Fisheries, and Wildlife Biology, consent of instructor.

W F B 493 Selected Topics 1-4(1-4,0)F, S Specialized topics which explore current areas of research and management in aquaculture, fisheries science, or wildlife management are examined in lecture/seminar format. May be repeated for credit. *Preq:* Junior standing, consent of instructor.

W F B 499 Wildlife Biology and Fisheries Seminar 1(1,0)F, S Exploration of current literature and research in fisheries and wildlife sciences. Students participate in the analysis of research findings, utilizing skills acquired in their undergraduate programs. May be repeated once for credit.

WOMEN'S STUDIES

Professor: J. M. Melton; *Associate Professors:* B. Daniell, S. M. Sinke, E. K. Sparks

W S 301 Introduction to Women's Studies: Women's Lives 3(3,0) Interdisciplinary course exploring the unique features of women's lives from childhood to old age. Content is based on new research in many disciplines, including psychology, sociology, history, literature, and the arts. *Preq:* Sophomore standing.

W S 459, 659 Selected Topics in Women's Studies 1-3(1-3,0) Topics change from semester to semester and are announced prior to registration. May be repeated for a maximum of six credits, but only if different topics are covered.

W S 498 Advanced Studies inWomen's Studies 3(3,0) Focuses on the theoretical foundations for women's studies, with particular emphasis on how women's studies research and theory influence institutions and governmental policies. Readings include essays on such central women's studies issues as work, family, children, health care, legislation, and government policies. *Preq:* W S 301 or consent of instructor.

FACULTY

Aadland, Rolf Konrad, *Adjunct Associate Professor of Geological Sciences*. BS, University of Houston, 1964; MS, University Nebraska, 1967; PhD, University of Idaho, 1980

Abercrombie, Andrea Harrill, *Lecturer in Public Health Sciences*. BS, 1994, MEd, 1995, Clemson University

Abbott, Albert Glenn, *Associate Professor of Biochemistry*. BS, University of Connecticut, 1976; PhD, Brown University, 1980

Abramovitch, Rudolph Abraham, *Professor of Chemistry*. BS, Alexandria University, 1950; PhD, King's College, 1953; DSc, University of London, 1964

Acton, James Crockett, *Stender Professor of Food Science and Human Nutrition*. BS, 1965, PhD, 1970, University of Georgia

Adams, Clementina Rodriguez, *Associate Professor of Spanish*. BA, Atlantico University (Colombia), 1969; MS, 1974, PhD, 1984, Florida State University

Adams, Cora Stephanie, *General Librarian*. BA, Evergreen State College, 1997; MLS, University of North Carolina, 2000

Adams, Warren Philip, *Professor of Mathematical Sciences*. BS, Lewis University, 1979; MS, 1981, PhD, 1984, Virginia Polytechnic Institute and State University

Adelberg, Jeffrey William, *Assistant Professor/Research Associate of Horticulture*. BS, 1982, MS, 1987, Rutgers University; PhD, Clemson University, 1993

Adler, Peter Holdridge, *Professor of Entomology*. BS, Washington and Lee University, 1976; MS, 1979, PhD, 1983, Pennsylvania State University

Agostini, Bertrand, *Visiting Associate Professor of Languages*. BA, University of Angers (France), 1979; MA, University Catholique, 1981; PhD, University of Nantes, 1991

Alberts, James Joseph, *Adjunct Professor of Zoology*. BA, Cornell College, 1965; MS, Dartmouth College, 1967; PhD, Florida State University, 1970

Albrecht, John Ernest, *Professor of Animal and Veterinary Sciences, Pee Dee Research and Education Center*. BS, Delaware Valley College, 1965; MS, 1968, PhD, 1971, North Carolina State University

Aldrich, Timothy Earl, *Adjunct Associate Professor of Health*. BS, 1972, MPH, 1979, PhD, 1985, University of Texas

Alexander, John Calvin, Jr., *Breazeale Professor of Financial Planning; Professor of Finance*. BBA, 1984, MBA, 1985, Stetson University; PhD, Florida State University, 1991

Allen, Benjamin Louis, Jr., *Adjunct Professor, GHS/CU Biomedical Cooperative; Chief of Staff, Greenville Unit, Greenville Hospital System*. BS, Wofford College, 1960; MD, Duke University, 1964

Allen, Craig Reece, *Assistant Leader of South Carolina Cooperative Fish and Wildlife Research Unit; Assistant Professor of Wildlife and Fisheries Biology*. BS, University of Wisconsin, 1989; MS, Texas Tech University, 1993; PhD, University of Florida, 1997

Allen, Dennis Michael, *Adjunct Professor of Forest Resources*. BS, Hobart College, 1972; MS, 1974, PhD, 1978, Lehigh University

Allen, Lawrence Robert, *Associate Dean, College of Health, Education, and Human Development; Professor of Parks, Recreation, and Tourism Management*. BS, West Chester State University, 1970; MS, 1974, PhD, 1979, University of Maryland

Allen, William Harold, *Professor of Agricultural and Biological Engineering*. BS, 1966, MS, 1969, Clemson University; PhD, University of Tennessee, 1972; PE

Alley, Pamela R., *Visiting Assistant Professor of Psychology*. BA, 1975, MA, 1978, PhD, 1983, University of Connecticut

Alley, Thomas Robertson, *Professor of Psychology*. BA, BS, Pennsylvania State University, 1975; MA, 1979, PhD, 1981, University of Connecticut

Allison, David John, *Associate Professor of Architecture*. BS, 1978, MArch, 1982, Clemson University

Alverson, David Roy, *Professor of Entomology*. BS, 1968, MS, 1976, Clemson University; PhD, University of Georgia, 1979

Amirkhanian, Serji, *Professor of Civil Engineering*. BS, 1979, MS, 1981, Tennessee Technological University; PhD, Clemson University, 1987

An, Yanming, *Assistant Professor of Chinese*. MA, Fudan University (China), 1985; PhD, University of Michigan, 1997

An, Yuehuei Huey, *Adjunct Assistant Professor of Bioengineering*. BM, Harbin Medical University School of Medicine (China), 1983; MM, Beijing Medical University Graduate School (China), 1986

Anand, Subhash Chandra, *Professor of Civil Engineering*. BS, Banaras Hindu University (India), 1955; MS, 1965, PhD, 1968, Northwestern University; PE

Anderson, David Paul, *Adjunct Professor of Chemical Engineering*. BA, Clemson University, 1973; MS, 1977, PhD, 1981, University of Massachusetts

Anderson, Paul Christopher, *Visiting Assistant Professor of History*. BA, University of North Carolina, 1990; MA, 1994, PhD, 1998, University of Mississippi

Anderson, Vicki Truluck, *Adjunct Assistant Professor of Medical Technology, McLeod Regional Medical Center*. BS, University of Tampa, 1972

Andrew, John Rodman, Jr., *Assistant Professor of History*. BA, University of North Carolina, 1987; MA, Clemson University, 1993; PhD, University of Georgia, 1997

Andrus, Ronald D., *Assistant Professor of Civil Engineering*. BS, 1983, MS, 1986, Brigham Young University; PhD, University of Texas, 1994

Anthes, Louis C., *Assistant Professor of History*. BA, 1990, MA, 1991, University of Chicago; PhD, New York University, 2000

Appling, Jeffrey Robert, *Associate Professor of Chemistry*. BS, 1980, PhD, 1985, Georgia Institute of Technology

Arbena, Joseph Luther, *Professor of History*. BA, George Washington University, 1961; PhD, University of Virginia, 1970

Arnold, Michelle J., *Lecturer in School of Nursing*. BS, 1995, MS, 1999, Clemson University

Arya, Dev Priya, *Assistant Professor of Chemistry*. BS, University of Delhi (India), 1996; PhD, Northeastern University, 1996

Ashton, Susanna Margaret, *Assistant Professor of English*. BA, Vassar College, 1989; MA, 1993, PhD, 1998, University of Iowa

Askew, George Robert, Jr., *Director, Belle W. Baruch Institute of Coastal Ecology and Forest Science; Professor of Forest Resources*. BS, 1976, MS, 1978, PhD, 1981, Clemson University

Aspland, John Richard, *Professor of Textiles*. BS, 1958, MS, 1960, Leeds University; PhD, Manchester University, 1964

Astle, Deana Lee, *Assistant Dean of Libraries; Librarian*. BA, Brown University, 1967; MLS, University of California, 1968; MA, University of Utah, 1976

Austin, Eric Michael, *Assistant Professor of Mechanical Engineering*. BS, 1980, MS, 1982, University of Illinois-Urbana-Champaign; PhD, Virginia Polytechnic Institute and State University, 1998

Aziz, Nadim Mahmoud, *Professor of Civil Engineering*. BSCE, 1978, MS, 1980, PhD, 1984, University of Mississippi

Back, William Edward, *Assistant Professor of Civil Engineering*. BS, 1978, MS, 1986, University of Illinois; PhD, Clemson University, 1994

Backman, Kenneth Frank, *Assistant Professor of Parks, Recreation, and Tourism Management*. BS, Acadia University (Canada), 1980; MUP, 1985, PhD, 1989, Texas A&M University

Backman, Sheila Jane, *Professor of Parks, Recreation, and Tourism Management*. BSC, 1977, MR, 1979, Acadia University (Canada); PhD, Texas A&M University, 1988

Bailey, Beatrice Naff, *Professor of Curriculum and Instruction*. BA, Longwood College, 1978; MA, Bethany Theological Seminary, 1981; EdD, Virginia Polytechnic Institute and State University, 1987

Bailey, John Michael, *Lecturer in English*. BA, 1992, MA, 1994, Clemson University

Baillie, Eugene E., *Adjunct Professor of Biochemistry/Medical Technology*. BS, University of Nebraska, 1963; MD, University of Nebraska College of Medicine, 1967

Bain, Lisa J., *Assistant Professor of Environmental Toxicology*. BS, University of Georgia, 1992; PhD, North Carolina State University, 1997

Bainbridge, Robert Warin, *Lecturer in Planning and Landscape Architecture*. BArch, University of California-Berkeley, 1970; MArch, Rice University, 1978

Baird, William Vance, *Associate Professor of Horticulture*. BS, Oregon State University, 1976; MA, Miami University, 1979; PhD, University of Virginia, 1983

Balakrishnan, Nagraj, *Associate Professor of Management*. BE, University of Madras, 1981; MS, University of Kentucky, 1983; PhD, Purdue University, 1987

Balch, Clarence Almus, *Lecturer in Engineering Graphics*. BS, California Polytechnic State University, 1959

Baldwin, William S., *Adjunct Assistant Professor of Environmental Toxicology*. BS, Central Michigan University, 1989; PhD, North Carolina State University, 1995

Ballard, Robert Edward, *Professor of Botany*. BS, 1966, MA, 1968, Miami University; PhD, University of Iowa, 1975

Ballato, John Michael, *Assistant Professor of Ceramic and Materials Engineering*. BS, 1993, MS, 1995, PhD, 1997, Rutgers University

Barczewski, Stephanie Lynn, *Associate Professor of History*. BA, Columbia University, 1990; MA, 1991, MPhil, 1993, PhD, 1996, Yale University

Barefoot, Susan Ferguson, *Director, School of Applied Science and Agricultural Business; Professor of Food Science*. BS, 1971, MS, 1979, PhD, 1985, North Carolina State University

Barfield, Rayford Elliott, Jr., *Professor of English*. BA, LaGrange College, 1961; MA, University of Georgia, 1963; PhD, University of Tennessee, 1969

Bargeron, Jefferson Davis III, *Adjunct Assistant Professor of Biosystems Engineering*. BS, North Georgia College, 1969; MS, 1972, PhD, 1989, Clemson University

Barker, James Frazier, *President; Professor of Architecture*. BArch, Clemson University, 1970; MArch, Washington University, 1973; FAIA

Barkley, David Lane, *Professor of Agricultural and Applied Economics*. BA, Furman University, 1969; MA, University of Georgia, 1972; PhD, Iowa State University, 1976

Barmore, Charles Rice, *Adjunct Professor of Food Science and Human Nutrition and Packaging Science*. BS, Clemson University, 1966; MS, 1969, PhD, 1972, University of Florida

Barrett, David Elm, *Professor of Educational Foundations*. BA, Wesleyan University, 1969; MS, 1973, PhD, 1974, University of Southern California

Barron, Charles Henson, Jr., *Professor of Chemical Engineering*. BS, Clemson University, 1959; DSc, University of Virginia, 1963

Bates, Joseph R., *Lecturer in English*. BA, 1997, MA, 2000, Clemson University

Bates, William G., *Biomedical Professor, GHS/CU Biomedical Cooperative; Principle Care, Inc*. BS, 1962, MD, 1965, University of North Carolina

Battisto, Dina Gene, *Assistant Professor of Architecture*. BArch, University of Tennessee, 1991; MArch, Clemson University, 1993; MS, University of Michigan, 1996

Bauer, Larry Lee, *Professor of Agricultural and Applied Economics*. BS, University of Illinois, 1961; MS, Purdue University, 1963; PhD, North Carolina State University, 1968

Bauer, Philip, *Adjunct Associate Professor of Crop and Soil Environmental Science*. BS, 1979, BS, 1982, MS, 1985, University of Wisconsin; PhD, Texas A&M University, 1988

Baum, Carl William, *Associate Professor of Electrical and Computer Engineering*. BS, University of California, 1987; MS, 1989, PhD, 1992, University of Illinois

Bausman, Dennis Charles, *Lecturer in Construction Science and Management*. BS, Iowa State University, 1971; MCSM, Clemson University, 1995

Bausser, Janet Jayne, *Assistant Professor of English*. BA, University of California, 1967; MLS, University of Hawaii, 1972; MA, North Carolina State University, 1993; PhD, Ohio State University, 2000

Bautista, Gloria, *Professor of Spanish*. BA, Javeriana University (Colombia), 1972; MA, 1975, PhD, 1987, State University of New York

Baxa, Ernest Granville, Jr., *Associate Professor of Electrical and Computer Engineering*. BEE, University of Virginia, 1962; MSEE, 1968, PhD, 1970, Duke University

Bayles, Lucy J., *Visiting Associate Professor of Educational Foundations*. BS, Miami University, 1967; MS, 1981, EdD, 1987, Ball State University

Beasley, Donald Erwin, *Professor of Mechanical Engineering*. BS, 1978, MS, 1980, Clemson University; PhD, University of Michigan, 1983

Beattie, Robert J., *Biomedical Professor, GHS/CU Biomedical Cooperative; Director, Animal Resource Facility, University of South Carolina*. BS, 1962, DVM, 1964, Kansas State University

Bechtel, Deborah Ann, *Assistant Professor in School of Nursing*. BSN, Radford University, 1982; MS, University of Delaware, 1985; PhD, University of Texas, 1993

Becker, Robert Henry, *Director, Strom Thurmond Institute; Professor of Parks, Recreation, and Tourism Management*. BS, Pennsylvania State University, 1970; MA, 1973, PhD, 1976, University of Maryland

Bedard, David Matthew, *Assistant Professor of Military Science*. CPT, U.S. Army; BA, University of New Hampshire, 1991

Bednar, John Clay, *Director, Language and International Trade Program; Professor of French*. BA, Princeton University, 1965; Doctorat d'univeresité, University of Besancon (France), 1969

Behery, Hassan Mohamad, *Professor of Textiles*. BS, 1950, MS, 1955, Alexandria University; PhD, University of Manchester, 1959; CText; FTI

Belcher, Cynthia Leahy, *Assistant Professor in School of Nursing*. BSN, University of Miami, 1969; MN, Emory University, 1971

Bell, Lansford Charles, *S. E. Liles Distinguished Professor of Construction Engineering*. BS, 1965, MS, 1968, University of Maryland; PhD, Vanderbilt University, 1972; PE

Bellinger, Robert Glenn, *Extension Associate/Associate Professor of Entomology*. BS, 1974, MS, 1979, University of Maryland; PhD, Virginia Polytechnic Institute and State University, 1985

Benjamin, Daniel Kelly, *Professor of Economics*. BA, University of Virginia, 1969; MA, 1971, PhD, 1975, University of California-Los Angeles

Bennett, Alma, *Associate Professor of English and Humanities*. BM, Belhaven College, 1962; MS, Radford University, 1974; PhD, University of Texas, 1991

Benson, Eric Peter, *Associate Professor of Entomology*. BS, University of Vermont, 1979; MS, Fairleigh Dickinson University, 1984; PhD, Clemson University, 1988

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Guse, Neal Gregory, *Adjunct Professor of Parks, Recreation, and Tourism Management*. BS, Humboldt State College, 1959; MS, Colorado State University, 1966

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Taylor, Mary Anne, *Associate Professor of Psychology*. BA, Western Kentucky, 1983; MS, Virginia Polytechnic Institute and State University, 1985; PhD, University of Akron, 1990

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Addison, Clarence Lee Benjamin, MArch, *Professor Emeritus of Construction Science and Management*

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Black, Jonathan, PhD, *Professor Emeritus of Bioengineering*

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Bookmyer, Beverly Brandon, PhD, *Professor Emerita of Physics and Astronomy*

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COURSE ABBREVIATIONS

A A H	Art and Architectural History
A A S	African American Studies
A S	Aerospace Studies
A S L	American Sign Language
ACCT	Accounting
AFLS	Agriculture, Forestry, and Life Sciences
AG ED	Agricultural Education
AG M	Agricultural Mechanization
AGRIC	Agriculture
AN PH	Animal Physiology
ANTH	Anthropology
AP EC	Agricultural and Applied Economics
ARCH	Architecture
ART	Art
ASTR	Astronomy
AVS	Animal and Veterinary Sciences
B E	Biosystems Engineering
BIO E	Bioengineering
BIOCH	Biochemistry
BIOL	Biology
BIOSC	Biological Sciences
BOT	Botany
BUS	Business
C E	Civil Engineering
C ED	Coaching Education
C H S	Calhoun Honors Seminar
C M E	Ceramic and Materials Engineering
C R D	Community and Rural Development
C R P	City and Regional Planning
C S M	Construction Science and Management
C U	Clemson University
CH	Chemistry
CHIN	Chinese
CH E	Chemical Engineering
CP SC	Computer Science
CSENV	Crop and Soil Environmental Science
DANCE	Dance
DSIGN	Design Studies
E C E	Electrical and Computer Engineering
E G	Engineering Graphics
E L E	Executive Leadership and Entrepreneurship
E M	Engineering Mechanics
E N R	Environmental and Natural Resources
ECON	Economics
ED	Education
ED C	Educational Counseling
ED F	Educational Foundations
ED L	Educational Leadership
ED SP	Special Education
EE&S	Environmental Engineering and Science
EN SP	Environmental Science and Policy
ENGL	English
ENGR	Engineering
ENT	Entomology
ENTOX	Environmental Toxicology
EX ST	Experimental Statistics
F&RR	Forest and Recreation Resources
FD SC	Food Science
FD TH	Food Technology
FIN	Finance
FOR	Forest Resources
FR	French
G C	Graphic Communications
G S	Graduate Studies
G W	Great Works
GEN	Genetics
GEOG	Geography
GEOL	Geology
GER	German
H ADM	Hospital and Health Services Administration
H R D	Human Resource Development
HIST	History
HLTH	Health
HORT	Horticulture
HUM	Humanities
I E	Industrial Engineering
I P M	Integrated Pest Management
IN ED	Industrial Education
ITAL	Italian
JAPN	Japanese
L S	Leisure Skills
L&IT	Language and International Trade
LANG	Language
LARCH	Landscape Architecture
LATIN	Latin
LAW	Legal Studies
M B A	Business Administration
M E	Mechanical Engineering
M H A	Master of Health Administration
M S	Military Science
MA SC	Management Science
MAT E	Materials Engineering
MGT	Management
MICRO	Microbiology
MKT	Marketing
MTHSC	Mathematical Sciences
MUSIC	Music
NPL	Nonprofit Leadership
NURS	Nursing
NUTR	Nutrition
P A	Performing Arts
PH SC	Physical Science
PHIL	Philosophy
PHYS	Physics
PKGSC	Packaging Science
PL PA	Plant Pathology
PL PH	Plant Physiology
PO SC	Political Science
PO ST	Policy Studies
PORT	Portuguese
PRTM	Parks, Recreation, and Tourism Management
PSYCH	Psychology
R S	Rural Sociology
READ	Reading
REL	Religion
RUSS	Russian
SOC	Sociology
SPAN	Spanish
SPCH	Speech
T C	Textile Chemistry
TEXT	Textile Management
THEA	Theatre
THRD	Technology and Human Resource Development
VT ED	Vocational-Technical Education
W F B	Wildlife and Fisheries Biology
W S	Women's Studies

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